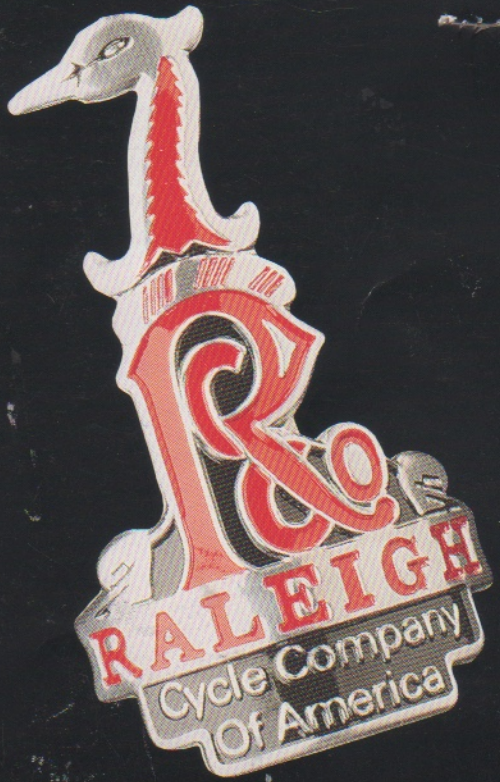
RALEIGH®

BICYCLE OWNER'S MANUAL



Owner's Responsibility

This manual contains important information regarding the safe operation and maintenance of your bicycle. We urge you to read it and carefully follow the instructions. Instructions preceded by the words NOTE, CAUTION, or WARNING are of special significance.

NOTE: Instructions which are of special interest.

CAUTION: Instructions which, if not followed, could result in mechanical damage or failure.

WARNING: You should pay special attention to these instructions since failure to do so may result in injury to the rider.

Also, carefully follow the instructions in any additional literature supplied with this bicycle.

WARNING: Before your first ride, check the brakes and quick release units. Service, if necessary, is described in the maintenance section of this manual.

Theft and Warranty Information

Record all numbers shown on the bicycle frame.
Be sure to fill out and mail in the warranty card for your bicycle.

Note: the serial number is your proof of purchase. It is not on record where your bicycle was sold or manufactured.

Keep the following information along with a copy of your sales receipt.

Serial Number_____

Code Number_____

Model Name _____

Store Purchased From_____

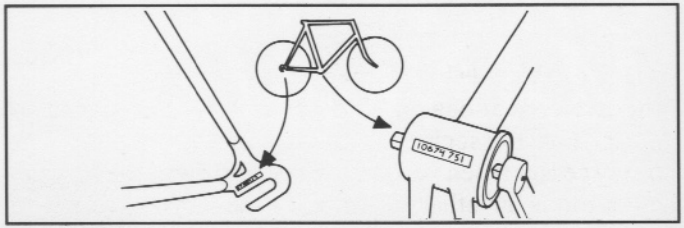
Date _____

Color _____

Lock your bicycle securely whenever it is out of your sight!

Register your bicycle with your local law enforcement agency. Report any theft immediately.

Add your bicycle to your homeowner's or apartment dweller's insurance policy.



You are now the owner of a new Raleigh bicycle, ready and willing to give you years of comfortable, efficient, and trouble-free service.

Our dealers are well experienced in the assembly, adjustment, maintenance and, if in the future the need arises, the repair of your bicycle. This manual cannot supplant the expertise your dealer can offer you. It can, however, offer you an introduction into the tools, techniques and practices that will add years to your bicycle's useful life.

In order to qualify for our limited warranty, your bicycle must be completely and properly assembled by an authorized Raleigh dealer and professional bicycle mechanic.

There is a world of two-wheeled adventure out there waiting for you, whether you're on a jaunt to the corner market or a journey across the continent. Raleigh, now into its second century, one of the premier builders of fine racing bicycles, has established a solid reputation as a maker of touring cycles and mountain bicycles, and remains at the forefront of cycling technology.

Slip on your helmet, step onto the pedals, and join us in rediscovering the freedom of the bicycle!

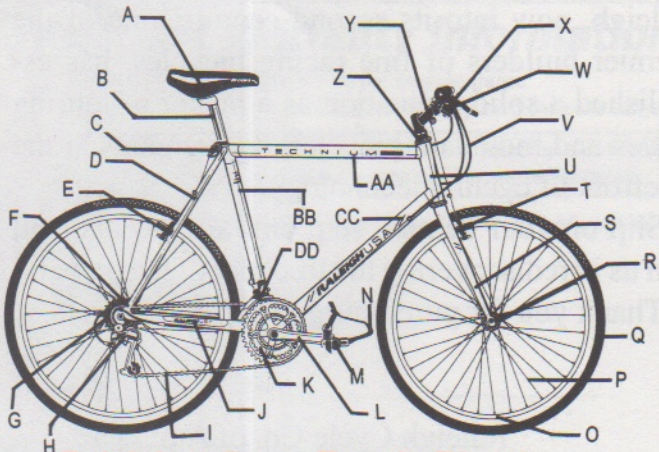
Thank you for purchasing a Raleigh bicycle.

Raleigh Cycle Co. of America

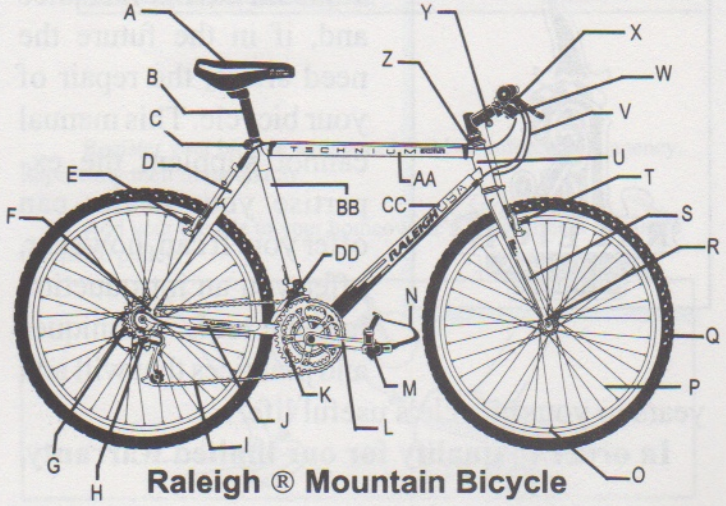
Anatomy of a Bicycle

A - Saddle
B - Seatpost
C - Quick Release
D - Seatstay
E - Rear Brake
F - Rear Dropout
G - Freewheel
H - Rear Derailleur
I - Chain
J - Chainstay
K - Chainring
L - Crankarm
M - Pedal
N - Toe Clip
O - Rim
P - Spoke
Q - Tire
R - Hub
S - Front Fork
T - Front Brake
U - Head Tube
V - Brake Cable
W - Thumbshifters
X - Brake Lever
Y - Handlebar/Stem
Z - Headset
AA - Top Tube
BB - Seat Tube
CC - Down Tube
DD - Front Derailleur

Reflectors Not Shown. See Page 11.



Raleigh ® Cross Terrain Bicycle

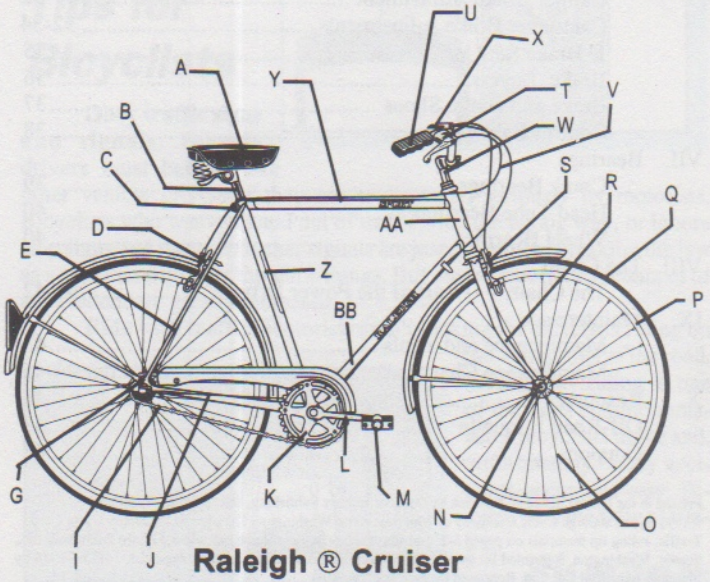


Raleigh ® Mountain Bicycle

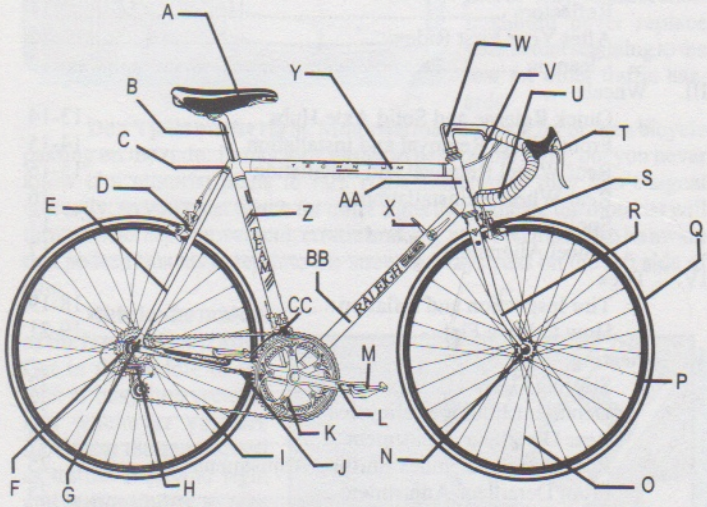
Anatomy of a Bicycle

A - Saddle
B - Seatpost
C - Seat Tube Binder Bolt
D - Rear Brake
E - Seatstay
F - Freewheel
G - Rear Dropout
H - Rear Derailleur
I - Chain
J - Chainstay
K - Chainring
L - Crankarm
M - Pedal
N - Hub
O - Spoke
P - Rim
Q - Tire
R - Front Fork
S - Front Brake
T - Brake Lever
U - Handlebar
V - Brake Cable
W - Stem
X - Thumbshifters / Shift Levers
Y - Top Tube
Z - Seat Tube
AA - Head Tube
BB - Down Tube
CC - Front Derailleur

Reflectors Not Shown. See Page 11.



Raleigh ® Cruiser



Raleigh ® Racing and Touring Bicycle

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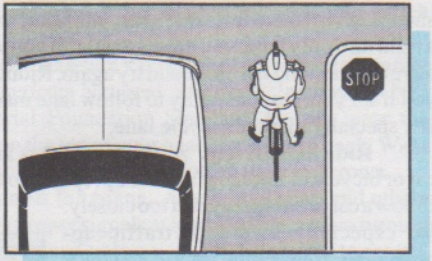
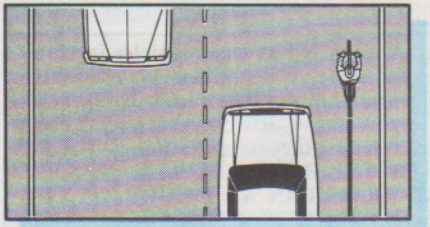
I RULES OF THE ROAD

Traffic Tips for Bicyclists

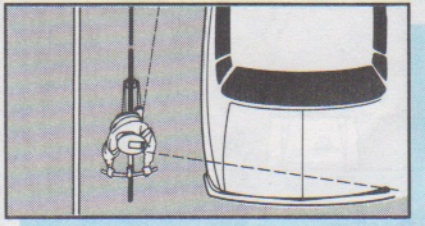


Obey traffic signs and signals. Bicycle drivers must behave like other vehicle drivers if they are to be taken seriously by motorists. Bicyclists who weave in and out of traffic, ride the wrong way, or ignore stop signs, red rights and other signals are just as guilty of breaking the law as a motorist who does the same things. But, more importantly, chances of an accident are greatly increased.

Ride with traffic. Motorists aren't looking for bicyclists riding on the wrong side of the road. Wrong-way riding is one of the most common mistakes bicyclists make and, unfortunately, many accidents occur this way. Bicycle with the flow of traffic.

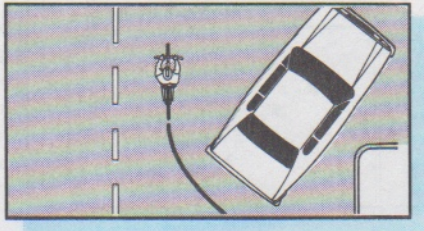


Scan the road behind. Learn to look over your shoulder without losing your balance or swerving left. Some riders use rear-view mirrors. It is best to have a rear view mirror only as insurance. It should never replace your actual scanning to the rear for other traffic hazards.

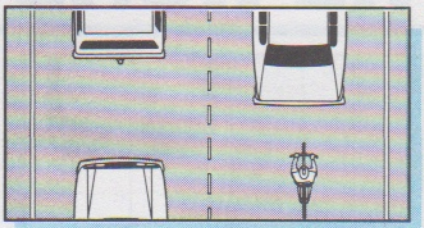


Don't pass on the right. Motorists may not look for or see a bicycle passing on the right. It may look easier to pass on the right, but you never know if a motorist plans to turn right. Sometimes they don't signal correctly, so you must watch for other signs that indicate the motorist will turn, such as head movement, erratic braking, etc. You must also be aware that pedestrians may step into the street. Always pass on the left side of cars.

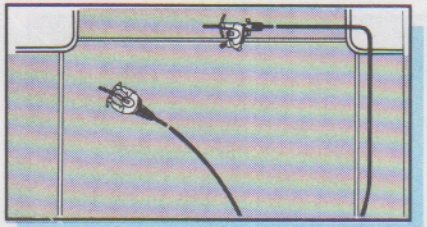
Ride in the middle of the lane in slow traffic. Get in the middle of the lane at busy intersections and whenever you are moving at the same speed as traffic. It is your right and responsibility to take control of the lane when you are moving at the same



speed as the other vehicles. Make sure your intentions are known by signaling correctly, and motorists will be better able to understand what you are doing. But remember that when the speed in the lane increases, then you should move as far right as practical without danger to yourself or others.



Choose the best way to turn left. There are two ways to make a left turn, depending on your skill. *Like a pedestrian*. Ride straight to the far crosswalk. Walk your bike across. It is dangerous to others when you ride your bicycle in a crosswalk full of pedestrians. *Like an auto.* Signal, scan behind for traffic, move into the left lane, yield to oncoming cars, and turn left when the way is clear. When turning like an automobile, it is best for you to have experience bicycling in traffic. Once you have gained that experience, making left turns this way is still not recommended if it is a very busy intersection.

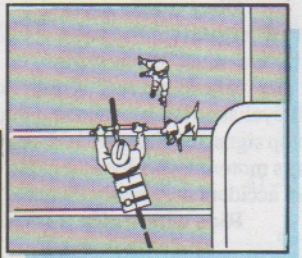


Keep both hands ready to brake. You may not stop in time if you brake one-handed. It is very dangerous to try to carry something in one hand and steer your bicycle with the other, especially when braking.

Follow lane markings. When on a street with multiple lanes, you should move to the left lane when you want to turn left. When you are in a right turn only lane, you must go right. If you wanted to go straight, you'll have to go around the block and try again. Riding a bicycle does not exempt you from your responsibility to follow lane markings for cars, unless there is a specially marked bicycle lane.

Ride defensively. A safe bicyclist is an alert bicyclist. Watch the car or bicycle in front of you and be prepared to take defensive action. Don't follow a car or another cyclist too closely.

Be especially aware of traffic approaching from behind in case you must swerve to avoid something, and of the car which will pass you only to turn right immediately in front of you.



CAUTION: In many states wearing headphones while riding a bicycle or other legal vehicle is against the law. They restrict your hearing. Don't wear headphones while riding a bicycle!

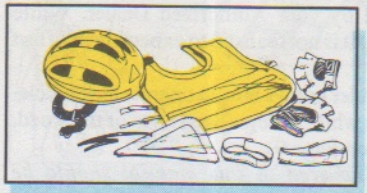
Note: Because bicycles are recognized as legal vehicles in all 50 states, they are subject to the same rules and laws as are motor vehicles. Therefore, it is essential that you follow basic traffic rules and that you consult your local motor vehicle code, or its equivalent for rules and regulations concerning bicycle operation. FAILURE TO OBEY THE RULES OF THE ROAD AND ALL TRAFFIC REGULATIONS COULD RESULT IN AN INJURY TO THE RIDER AND OTHERS.

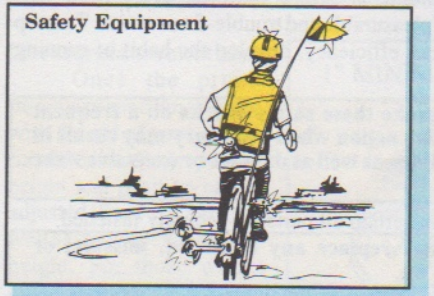
Always wear a properly fitting helmet. More than 80 percent of all bicycle related injuries and deaths are caused by accidents which involve the head.

When buying a helmet, make sure it meets the bicycle helmet safety standards of either the American National Standards Institute (ANSI Z90.4) or the Snell Memorial Foundation Standard. Do not wear the helmet improperly. Wear it on the top of your head, not pushed back. Wear the helmet no more than two fingers from the top of your eyebrows.

Always use hand signals for turns. Advise motorists and others what you plan to do by giving proper signals at least 100 feet before turning or stopping and while waiting to turn, unless your hand is needed to control your bicycle. The preferred signalling for bicycles is to point to the direction they are turning, with arm and finger extended. Always check your local bicycle regulations for legal requirements of turning or stopping. When riding with a group of cyclists, learn to point out hazards such as glass, grates and other hazards to following riders.

Children should never ride at dusk or night. Adults shouldn't either, but if they have to they should exercise extreme caution. There's no question about it, riding at night is 15 to 20 times more dangerous than riding during the day. If you must ride at night, avoid areas of heavy traffic, ride slowly, and, if possible, ride on streets already familiar to you. Make sure your bicycle has properly positioned reflectors, and an adequate headlight and taillight. If the reflectors are broken, replace them right away. Use the most visible lighting system you can, such as a rechargeable battery pack, so you have lights when the bike isn't moving, as at a stop light. Add additional reflectors to the rear. Wearing white clothing isn't enough either. Wear light colored or retro-reflective clothing and accessories. Any device that moves will help get approaching motorist's attention (i.e. leg lights, pedal reflectors, flashing yellow lights). Wear a reflective stripe(s) on your helmet.





Use extra caution in wet weather. Reduce your speed in wet or damp conditions, as tires will slide more easily. If your brakes or wheels rims are damp, it will take greater distance to come to a stop. Vision, especially in the rain, may be obscured. Wear a bright colored rain jacket or poncho for visibility when riding in rain or fog.

Beware of carrying extra clothing where it can hang down and jam in a wheel, or obstruct your reflectors or lights. Don't ride with both hands off the handlebars, you never know when the unexpected can happen.

Safety: Check on it!

By spending a few moments before and after every ride, your bicycle can give you years of pleasurable and trouble-free service. To keep your bicycle operating at peak efficiency, develop the habit of running through these safety checks.

WARNING: Failure to make these safety checks on a frequent basis and to take corrective action when necessary may result in injury to the rider and others, as well as damage or excessive wear to the bicycle.

INSPECTION: Make certain all parts are securely fastened.

WARNING: Immediately replace any damaged, missing, or badly worn parts.

STEERING: Make sure your handlebar is property positioned. (See Page 10-11). Keep your headset bearings adjusted and lubricated (See Page 40).

BRAKES: Check and adjust if necessary on a regular basis, with special attention to any time the brakes don't seem to perform as well as they had in the past. Caliper brakes must be adjusted on a regular basis. Never let wax, oil, or preservatives build up on the wheel rims or caliper brake shoes. Check the clamp bolt on coaster brakes. (See Page 30).

WHEELS: Always keep your wheels aligned (centered) in the frame. **CHECK quick releases or wheel nuts every time you mount, even if you've only been off your bicycle for a few minutes.**

TIRES: Keep inflated as instructed in the tire inflation and inspection section (See Page 18-19). Replace if little or no tread is left, or if there is a cut into the fabric of the tire.

SPOKES: Keep your spokes tight. Have your dealer replace broken spokes IMMEDIATELY, and retrue your wheels if they are knocked out of round or begin to wobble.

BEARINGS: Keep your bearings adjusted as shown in Front and Rear Wheel Bearings Section(See Page 40). Keep lubricated as shown in Lubrication on Page 44-45.

CHAIN: Keep adjusted and lubricated (See Page 41-42 for chains, Page 42 for lubrication).

SHIFT MECHANISMS: Check (and adjust if necessary) on a regular basis or any time shifting is a problem. Symptoms may include noise, difficult shifting, or shifting off your chainrings for derailleur bicycles, or failure to shift or hanging up between gears on a three-speed bicycle. (See Page 22-28).

REFLECTORS: Keep clean, properly positioned, and replace if cracked or broken. (See Page 11).

SEAT: Keep tight and positioned. (See Page 9-10).

CRANK: Keep crank arms tight on the spindle. A loose, worn, or damaged sprocket may cause excess wear or damage to the chain, difficult shifting, or cause the chain to come off the gears. Keep crank bearings adjusted (See Page 39).

PEDALS: Keep securely fastened in crankarms. Lubricate (See Page 44-45). Replace damage or worn pedals immediately.

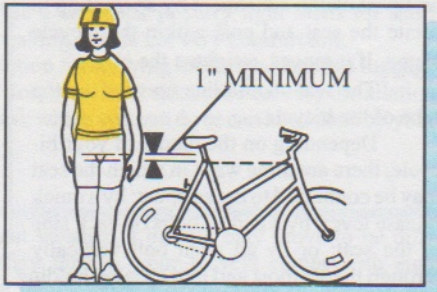
FRAME: IMMEDIATELY replace a cracked or bent frame. If the paint is cracked and distorted at any frame connection point, IMMEDIATELY have the frame inspected by your Authorized Dealer. While frames are designed for long service, it is not realistic to expect them to last forever.

RIDER: Be certain that the rider knows how to operate the bicycle. In all situations, use common sense while riding. (See Rules of the Road, Pages 5-6, and Operation, starting on Page 9).

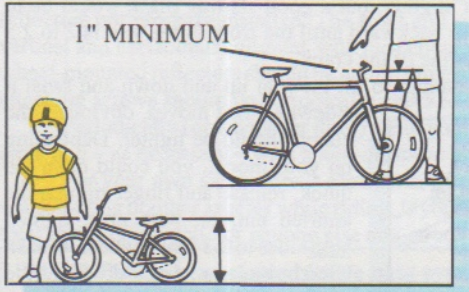
Any corrective action not covered in this manual should be performed by your Authorized Dealer.

II THE PROPER FIT

The Frame

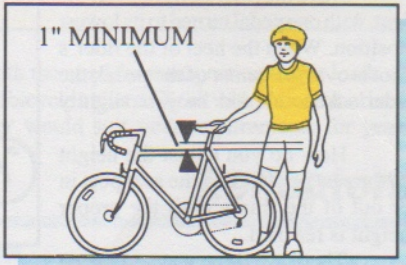


Bicycles come in a variety of sizes, and like anything else, a proper fit is essential for safe and proper performance. If the bicycle is too small, the rider will be uncomfortable and inefficient. Riding a bicycle with too large a frame is dangerous, as it can lead to a loss of control and injury.



A rule of thumb is that the intended rider should be able to straddle the top tube of the frame, with both feet flat on the ground, and still have at least one inch of clearance. Females desiring a traditional woman's or a mixte frame should use a frame with a horizontal top tube as a measurement basis.

Once the proper frame size has been selected, with the aid of your Authorized Dealer, the proper seat height and position can be adjusted (See Page 9-10), as well as the proper handlebar height. For those with a longer or shorter reach, your dealer can install handlebar stems of the appropriate length.



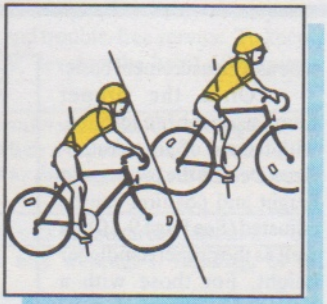
CAUTION: For safety and control, the rider must be able to straddle the bicycle with at least 1" of clearance over the horizontal tube when standing with both feet on the ground.

The Seat – Height and Position

What's the proper height and position of the seat — or saddle — of a bicycle? Obviously, where it is most comfortable and where it allows the rider to make the most efficient use of his/her muscles. While your Authorized Dealer first adjusted the bicycle for a comfortable fit, conditions and riders change and it's possible that the seat should be readjusted.

The Seat — Height and Position

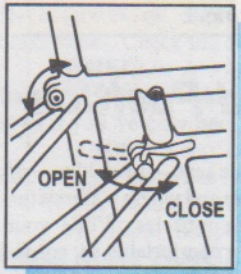
Seat Height

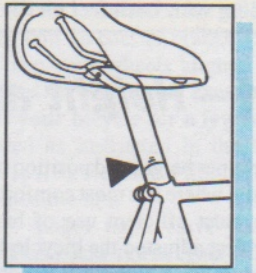


Have the rider sit upright on the seat, with one pedal turned to its lowest position. When the heel of the rider's foot is over the center of the pedal, the rider's knee should be just slightly bent.

How do you adjust the height of the seat? By sliding the seat post in or out of the frame until the proper height is reached.

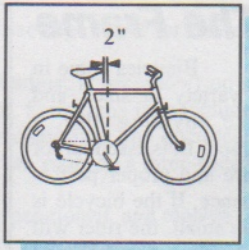
There are three ways to fasten the seat post at the proper height: a small quick release clamp on the frame where the seat post enters the seat tube; an allen head bolt and nut at that same position; or, an internal expanding wedge similar to the handlebar stem bolt, adjusted by an allen head bolt at the top of the seat post.





No matter what the fastening mechanism, seat posts all have a "MIN-IN" or "MAX-HT" mark which show the minimum safe amount of post inside the frame. **DO NOT** ride a bicycle if this mark is visible above the frame.

Before riding your bicycle, test the seat post clamp adustment by attempting to rotate the seat and post within the bicycle frame. If it moves, retighten the clamp.



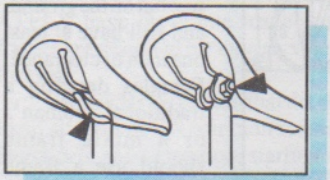
The seat should line up with the top tube of the bicycle.

Depending on the model of your bicycle, there are three ways in which the seat may be connected to the seatpost: by a quick release lever; by a pair of bolts on each side of the seat; or by an allen bolt vertically through the seatpost and into a clamp holding down the seat rails.

Normally, the top of the seat should be level. However, some riders may find it more comfortable to have the seat up or down slightly.

Riders will differ slightly, but a good starting place would be to adjust the seat forward or backward until the front of the seat is 2 to 2.5 inches **behind** the centerline of the crank.

After adjusting, attempt to tilt the seat up and down and twist it sideways. If it moves, obviously the clamp should be tighter. Depending on your model, you could open the quick release and finger-tighten the knurled nut; or, with nuts, tighten both sides to 8.3 foot pounds. With an allen bolt clamp, cinch down a little more on your allen wrench.



Luggage Racks

Attempting to carry an object or parcel in your hand while riding your bicycle is extremely dangerous, and can very easily lead to a loss of control.

Some cyclists will use a backpack to carry light loads for short distances, but, generally speaking, this is not very comfortable.

Probably a better solution for carrying moderate loads is a luggage rack (and, if needed bags.) Most bicycles are designed for easy installation of option luggage racks, a task which you can do or can have done by your Authorized Dealer.

WARNING: Luggage racks are not designed to carry excessive loads or passengers, or to support child carriers.

Some cyclists, faced with the need for transporting larger loads or children, use specially designed bicycle trailers. Check with your Authorized Dealer as to whether a trailer would suit your requirements for your bicycle.

Reflectors

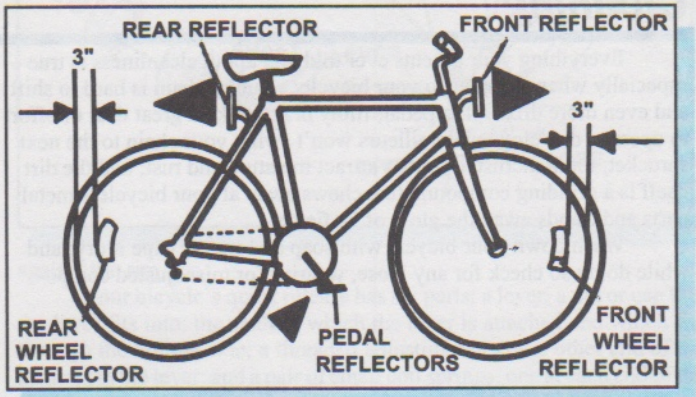
At dusk, in inclement weather, a bicycle may prove to be difficult to see. As a vital safety feature, your bicycle comes with eight reflectors: a white reflector on the front, a red reflector on the rear, and white reflectors attached to the spokes on both the front and rear wheels, and yellow on the front and rear of both pedals.

Don't ride your bicycle with damaged or missing reflectors, or with reflectors not properly installed. The front and rear reflectors should be vertical and horizontally aligned with the centerline of your bicycle. The wheel-mounted reflectors should be within three inches of the rim, and the attaching screws should be periodically checked for tightness.

Periodically (or whenever dirty) clean your reflectors with a damp cloth and – as necessary – with a *non-abrasive* household cleanser.

For your own safety, don't obstruct or cover any of the reflectors with clothing or other articles while riding. If your reflectors can't be seen, they're not doing you nor anyone else any good!

WARNING: Always use a bicycle light system for night riding.



After Your First Ride

Every machine needs periodic adjustments, and your bicycle is no different. Both for your own safety and comfort, and to protect your valuable bicycle, it's suggested that you perform the following checks after your first ride.

Check and adjust your brakes (See Pages 31-35).

Check and adjust your derailleurs or hub shifting systems (See Pages 23-25, 29).

Check your head set, crank and wheel bearings (See Pages 39-40)

Check your wheel quick releases or axle nuts (See Pages 13-14).

Check all other nuts, bolts and screws for tightness.

Clean your bicycle. Not only will you protect its finish, you will get rid of moisture-collecting dirt which will cause rust or corrosion and during the cleaning you're more likely to spot any loose nuts or bolts. In the future, during cleaning, you'll have a better chance to observe wearing parts or components.

Cleaning

Everything your parents ever told you about cleanliness is true – especially when it comes to your bicycle: a gunky chain is hard to shift and even more difficult to pedal; filthy brakes take a great deal of effort to operate; dirt-clogged derailleurs won't swing your chain to the next sprocket; mud-encrusted frames attract moisture and rust; and the dirt itself is a grinding compound that chews away at your bicycle's metal parts and sands away the gloss of its finish.

Wash down your bicycle with soap and water; wipe it dry; and while doing so check for any loose, wearing, or misadjusted components. Be sure to remove all soap from brake pads and rims.

Caution: Never wipe down a dirty bike without washing it first, the dirt will act just like a sandpaper.

A few minutes with a bucket of water will add years to the life of your treasured bicycle. Top this off with a liberal application of bike polish to keep your bicycle looking just like new.

III WHEELS

Quick-Release and Solid Axle Hubs

There are, for most practical purposes, two types of wheels: defined by the manner in which they are attached to the bicycle. One type has a threaded axle and wheel nuts, which clamp down on the forks to hold the wheel securely to the bicycle.

The other has a hollow axle, permitting a quick release skewer to pass through the hub and by the means of a lever and cam lock to both sides of the fork.

The quick release allows the cyclist to easily remove a wheel to repair a flat tire or to transport the bicycle.

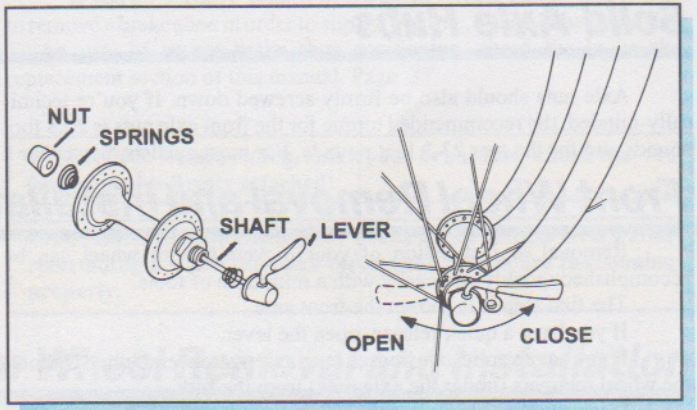
If properly installed and adjusted, either will firmly and safely attach the wheel to the frame. Either can be used on the front or the rear wheel assembly.

NEVER RIDE YOUR BICYCLE UNTIL YOU TEST BOTH THE FRONT AND REAR WHEEL FOR SECURE ATTACHMENT. FAILURE TO CHECK YOUR QUICK RELEASE MAY RESULT IN BODILY INJURY.

The easiest way to test your front wheel is to straddle your bicycle, lift the front wheel off the ground, and attempt to tap it downwards out of the dropouts.

Test the rear wheel by attempting to move it forward and downward, out of the dropouts. If the attaching mechanism of the rear wheel – axle nuts or quick release – is loose, the pressure of the chain can twist the wheel sideways and force the tire against the frame. The friction of the tire on the frame will bring the bicycle to a halt, just as if the brakes were pulled tight against the rim.

WARNING: Have your dealer demonstrate the correct use of the quick release mechanism on the wheels. Incorrect use may lead to a serious accident.



Your bicycle's quick release has six parts: a lever; a nut or cap that the lever fits into; the shaft to which the lever is attached and which fits through the hollow axle; a threaded adjusting nut at the other end of the shaft from the lever; and a pair of small coil springs, one at each end of the shaft between the nuts and the body of the wheel hub.

Quick-Release Hubs

To familiarize yourself with the quick release mechanism, do the following with the wheel on your bike:

Open the quick release lever so that the concave face is away from the bicycle. Hand screw the adjust nut until it is snug and just finger-tight against the dropout.

Tighten the quick release by turning the lever so that the convex side is away from the frame. This should require a firm, hard push to close, using the heel of your hand. If you can close the lever with just a couple of fingers, the adjusting nut is not tight enough! **The quick release, when tightened properly, will emboss the fork ends!**

When closed, the front quick release lever should be parallel to the fork blade. Most cyclists will have the lever on the left side of the forks.

The rear quick release lever, when closed, should point rearward.

Solid Axle Hubs

Axle nuts should also be firmly screwed down. If you're technically-minded, the recommended torque for the front axle nuts is 20.8 foot pounds and for the rear 23.3 foot pounds. For most cyclists, use either a fixed or adjustable wrench, and tighten the rear nuts so that the axle will not shift under pedaling pressure. The front nuts should be at approximately this same tension.

Front Wheel Removal and Installation

Removal or installation of your bicycle's front wheel can be accomplished quickly and easily with a minimum of tools.

The first step is to loosen the front axle.

If you have a quick release, open the lever.

If you have a solid axle, loosen both axle nuts several turns. Unhook the wheel retainers (under the axle nuts) from the fork.

If your brakes have a quick release feature, release it to move the brake shoes away from the wheel rim. This will allow the tire to slip through the space between the brake shoes.

If you have caliper brakes, either side pull or center pull, squeeze the brake shoes in against the wheel rim while moving the quick release lever to the open position. On a side pull brake, the quick release lever is normally on the brake arm where the brake cable connects. On center pull brakes, the release is normally at the end of the sheath through which the brake cable passes, just above the center wire. Release the brake shoes.

If you have cantilever brakes, squeeze the brake shoes in against the wheel rim while unhooking the end of the crossover cable that has a pull tab. Release the brake shoes.

If your bicycle does not have brakes with a quick release feature, it

WARNING: Check your wheel quick releases before each ride, and especially when remounting your bike after parking in a public space. Every time you check your axle quick releases, also check your brake quick release levers

Front Wheel Removal and Installation

is likely that you will have to use a wrench to remove one of the brake shoes.

Lift the front of the bicycle and let the axle drop free of the forks. Many bicycles are equipped with wheel retainers. These "hooks" which are part of the axle system lock into slots on the fork blades and provide added security. After opening the quick release lever, disengage the wheel retainer.

In many cases, the bicycle will balance on the front fork dropouts and the rear tire. If there is a possibility of tipping, lay the bicycle down on its left, non-derailleur side.

Installation is just the opposite.

Lift the front of the bicycle up, and slide the fork dropouts over the axle. Hook the wheel retainers into their slots on the front forks, center the rim between the two blades of the forks, and tighten the wheel nuts. When installing or tightening the nuts, make sure that the ridged end of each nut is against the wheel retainer. Use a wrench to tighten both nuts firmly. Recommended torque for nuts is 20.8 foot pounds.

If your bicycle is equipped with quick release hubs, center the wheel between the blades of the forks and close the quick release lever.

Make sure the hooks of the wheel retainer, if your bike is equipped with them, are engaged in the slots on the fork blades.

Pinch the brake shoes against the rim, and close the quick release lever for your caliper brakes, or re-hook the cross-over cable of your cantilever brakes.

If you do not have brakes with a quick release feature and you had to remove a brake shoe in order to slip the tire free, reinstall the brake shoe. To be sure of proper brake shoe positioning, check the brake shoe replacement section of this manual, Page 37.

WARNING: Before riding, check your brakes and check that the front wheel is firmly attached!

CAUTION: Always check your brake quick release levers after reinstalling a wheel, to make certain the brakes are functioning properly.

Rear Wheel Removal and Installation

Removal and reinstallation of the rear wheel, while it might look a little more complicated because of the chain and gear changers, is really no more difficult than changing the front wheel.

Shift the bicycle into the smallest gear on the freewheel or, if you have a three-speed hub, into the highest gear.

If you have a derailleur-equipped bicycle, check to see if you have a small boss or hook on the chainstay right above the freewheel. If so, hook the chain over it. This will keep the derailleur tensioned.

If you have a three-speed hub, unscrew the adjusting sleeve (on the end of the shift cable) all the way off the indicator. Unscrew the indicator from within the hub, and screw the indicator and sleeve back together in order not to misplace the indicator.

If you have a bicycle equipped with a coaster brake, remove the clamp fastening the coaster brake arm to the chainstay on the left side of the bicycle.

Rear Wheel Removal and Installation

Release the quick release lever of your brake, if you have that feature, or remove a brake shoe - as described in the Front Wheel section.

Loosen both axle nuts several turns.

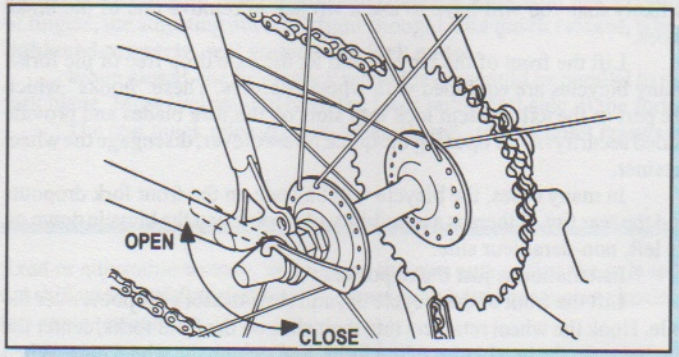
If, instead, you have a quick release hub, open the lever on the left hand side of the wheel.

Pull the rear derailleur to the rear just enough to allow the freewheel cluster to clear the rear derailleur, and gently move the wheel forward and down out of the dropouts.

For a one- or three-speed hub, slip the wheel forward and down out of the dropouts.

For all types of hubs, gently disengage the rear wheel gear from the chain.

If your bicycle is in a firm support, great. If not, lay it gently on its left, non-derailleur side.



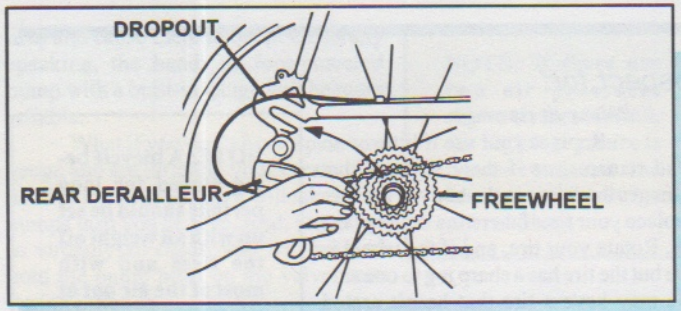
Rear Wheel Reinstallation

To reinstall the rear wheel bring the bicycle back upright and slip the wheel in between the chainstays, and with the rear gear within the loop of the drive chain.

For a derailleur bicycle, pull the jockey wheel of the rear derailleur to the rear and slide the axle into the slot of the rear dropouts. Allow the jockey roller to come forward as the axle moves to and within the slot.

Pull the wheel to the rear, center it, and securely tighten both axle nuts. Recommended torque for nuts is 23.3 foot pounds. Without a torque wrench, tighten both nuts to the point the axle will not slip under the pressure of pedaling. If your bicycle is equipped with quick release hubs, lock the lever. The lever should be difficult to close, and should take a firm pressure from the heel of your hand.

Rear Wheel Reinstallation



Free the chain from the hook on the seat stay, if your bicycle has one.

For three speed hubs, install the indicator within the hub, and tighten the indicator sleeve back on the indicator.

For coaster-brake equipped bicycles, refasten the coaster arm brake clamp to the left chainstay.

For bicycles with caliper or cantilever brakes with quick releases, close the quick releases. For brake systems without quick releases, reinstall the brake shoe you took off.

To be sure of proper brake shoe positioning, check the section on brake shoe installation and replacement on Page 37.

Before riding your bicycle after installation of the rear wheel, make certain that the brakes are functioning properly!

Spokes

Periodically check for any broken or loose spokes, as they can cause overloading of other spokes, a wobbly ride with excessive tire wear, and may cause the wheel to rub against the brake shoes.

If any spokes are broken or loose, or if the wheel rim has any noticeable wobble, have your Authorized Dealer readjust the spoke tightness and "true" or straighten the wheel.

Wheel Alignment

Make sure that both wheels stay centered in the bicycle frame so that the tires cannot rub on any part of the frame or fork.

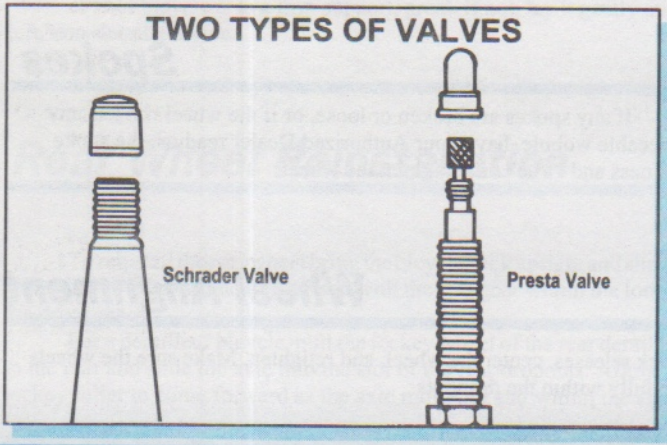
If either wheel needs to be centered, loosen the axle nuts or quick releases, center the wheel, and retighten. Make sure the wheels are fully within the dropouts.

IV TIRES

Tire Inspection And Inflation

Your tires provide your contact between your bicycle and the road, and as such may dramatically affect steering, braking, and pedaling effort. And, just as with an automobile, unsafe or worn tires present a hazard to the cyclist.

Take a moment, and periodically check your tires!



Inspect for:

√Wear or damage

Replace your tire if little or no tread remains, or if there is a cut that damages the fabric in the body of the tire. Replace your tire if there is a bulge in the tire. Rotate your tire, and if the wheel is true but the tire has a sharp jog to one side you may have a tire that hasn't seated properly or has a damaged body. Try bleeding off the air, pushing the tire back and forth on the rim, and reinflating. If the jog still exists, replace the tire.

NOTE: A bicycle being stored for long periods should be set up with all weight off the tires and with most of the air out of the tires.

√Proper inflation pressure

All tires lose air pressure over a period of time. Riding, or even sitting on, a bicycle with under-inflated tires may cause damage to the tube, tire, and wheel rim.

Proper air pressure ranges for each type of tire may be found on the sidewall of the tire. The wise cyclist will use a hand- or foot-operated pump to inflate tires. Service station meter-regulated air hoses may work; however, air should be added in only short spurts and checking tire seating after each spurt of air. Do not use unregulated air hoses, since this type of air supply can suddenly over-inflate

CAUTION: Unregulated air supply hoses such as found in many service stations may suddenly over-inflate a bicycle tire and cause it to burst!.

tires and cause them to burst. Generally speaking, the hand- or foot-powered pump with a built-in gauge will be more reliable.

What if you don't have a pressure gauge and are inflating your tires with a hand pump? First of all, it will take more pumps than you believe. And, secondly, in virtually all cases, you will have to hold the pump head on the valve stem during inflation.

NOTE: If there are two air pressures shown on the sidewall, the higher pressure is for on-road and the lower pressure is for off-road use.

Inflate until the tire feels hard to you. Rest your tire on the edge of a curb or similar edge and put your weight on the tire. If the sidewalls bulge out, plan on more pumping. If you run over a stone or edge, the tire can completely compress and allow damage to the rim. Your tire will also overheat by flexing as you ride. You want to see only a very slight flare in the sidewall when you put weight on the tire. It's a good idea to practice this at home, where you can measure the amount of flare-out when the tire is properly inflated.

Before adding air to any tire, make sure that that the thin ridge of rubber on the tire sidewall is the same distance from the wheel rim all around the tire/wheel on both sides. If it is not, and the tire does not appear to be seated properly, bleed some of the air from the valve and vigorously push the tire back and forth until it does seat. Add air gradually, stopping frequently to check tire seating and pressure, until the inflation pressure marked on the sidewall is reached.

Are there two tire pressures marked on your sidewall? The higher pressure is recommended for on-road use, and the lower for off-road use.

NOTE: There are two types of valves used on bicycle tubes. The Schrader valve is similar to that found on most automobiles, while the Presta valve has a small metal nut under the plastic cap which must be unscrewed before air can be pumped into the tube. There are adapters which will convert, for the purpose of inflation, one type of valve to the other. See page 18 Diagrams.

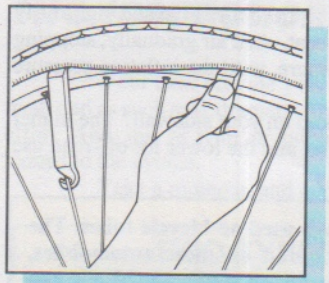
How to Fix a Flat

Everyone who rides a bicycle will eventually get a flat tire. But, with a little bit of planning, the roadside repair will be only a minor nuisance. The wise cyclist will carry a frame pump, patch kit, tire irons, an axle-nut wrench (for those without quick-release hubs), a cloth, and as a matter of convenience, a spare tube. Since there are two types of valves, Presta and Schrader, it's a good idea to make certain your pump and valves match.

First, remove the wheel. Follow the instructions on Page 14 of this manual on how to remove and install wheels.

Before removing the tire from the rim, attempt to locate the culprit that caused the flat. Great! If not, mark the position of the valve stem on

the tire. Deflate the tire completely and pinch the tire's beads toward the middle of the rim. If you can't do this with your hands, put the tire against the ground and lightly push down.



Remove one side of the tire from the rim. Some tires will yield simply to hand pressure, but most will require tire irons to pry the bead up and off the rim (see illustration). Avoid pinching the fragile tube between the tire iron and the rim. NEVER use a screwdriver or other sharp object, as these can further damage the tube.

Carefully remove the entire tube, starting by poking the valve stem back through the rim. Pull the tire from the rim.

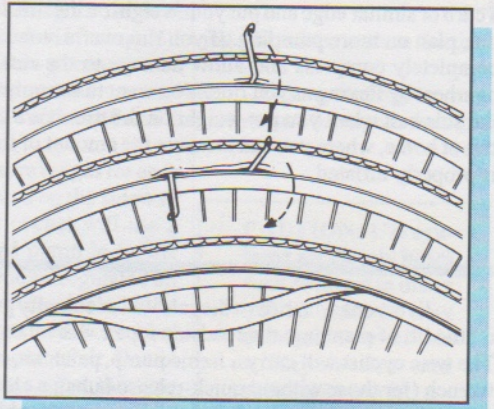
Most punctures are caused by thorns, small pieces of glass or metal penetrating the tire. Carefully check the inside of your tire to find the cause of your puncture. Failing that, partially inflate the tube and locate the leak. Recheck the corresponding section of tire again! Nothing is more frustrating than to have the same piece of glass repuncture your tube.

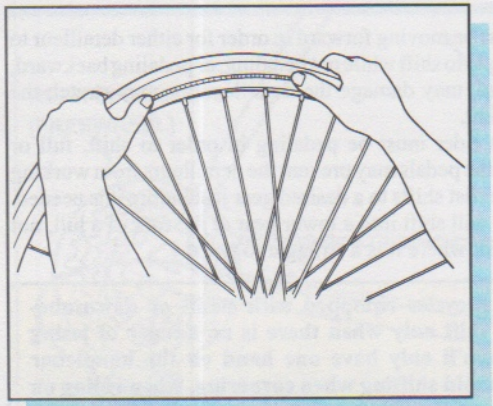
This is a good time to examine your tire and pluck out any objects stuck in the rubber but not yet cutting through the casing. If there is a cut or tear in the casing, the tire should be replaced immediately. For temporary use, a cut casing can be patched with a tube patch, but plan on replacing the tire as soon as you get home!

Check the rim to see that the spoke heads are covered by the rim strip. Use your cloth to wipe any possible puncture-causing debris from the inside of the tire and from the rim. Work the tire back onto the rim, one bead inside the rim the entire way around and the other bead off.

Some cyclists will replace the punctured tube with their spare, saving the patchwork until they return home. Whether you patch the damaged tube or replace it, push the tire back at the valve hole and insert the stem through the hole. Push the tube inside the tire the whole way around, making certain to keep the valve stem straight in the hole. Avoid twisting the tube. If you have a little talc or baby powder, dust the tube. This will substantially reduce the possibility of a pinched tube when you reinflate it.

Push the valve back out of its hole a bit, and put the remaining bead on the rim. Start at the valve, and slip the bead over the rim in both directions. Use your hands and thumbs to roll the bead on as far as you can. Many tires can be completely replaced on the rim without tools. If you are unable to work the last arc of the tire back onto the rim, VERY CAREFULLY use your





tire irons to lever it up and in. Insert the irons very carefully, and pry only against the rim to avoid pinching and perhaps damaging the fragile tube.

With the tire all the way back on, check again to see that the valve is straight. Push it up a bit to make certain that it is not preventing the tire from seating.

Pump a little air (20 PSI or so, but this is not critical) into the tire and deflate it again to relax any possible kinks in the tube. Using your hands, briskly roll the tire and tube laterally all the way around the rim. Pump the tire up again to about that same pressure and check the bead. Most tires have a small ridge visible outside the rim. The tire may not lift itself up onto the bead until there is more pressure in the tube, but what you are checking for are signs that the tire is lifting off the rim. If the bead looks good, pump up the tire until it is firm but not yet up to the rated pressure. Check the bead again, on both sides, making sure the tire is not bulging off the rim.

You may need to roll the tire to one side to help the air pressure lift the bead up onto its seat. When the bead looks good, pump the tire up to the pressure shown on the sidewall.

DON'T YIELD to temptation and inflate your tire with the air hose at a service station! One extra puff of air from that high pressure system and you'll suffer a major blowout.

Reinstall the wheel according to the instructions in this manual.

Patching a tube

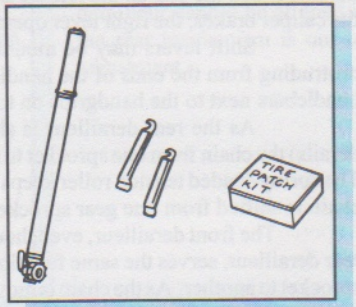
Patching a tube, whether on the road or at home, is simple. Locate the hole (inflate the tube and listen for the escaping air). Make certain the area to be patched is dry, as the glue and patches will not adhere to a moist surface. With the sandpaper in your patch kit, lightly abrade an area around the hole slightly larger than the patch. Dust off the residue.

Apply a thin coating of glue evenly to the prepared area, and let it dry.

Peel the metal foil away from the patch and put it on the prepared area. Leave the cellophane backing on the patch for now.

With one of your tire irons, the smooth edge of a coin, or something similar, vigorously rub down on the patch to seal it. Remove what's left of the cellophane backing.

Give it a few moments, then inflate the tube to see if the patch holds (and to make certain there are no other punctures).



V GEARING

Shifting Gears

There are two types of shifting mechanisms. The derailleur bicycle has a series of sprockets at the crank and at the rear wheel, and shifts by moving the chain from one sprocket to another. Depending on model, there can be as few as five or as many as 21 gear combinations.

Some bicycles are equipped with a series of three or four gears within the rear hub.

On a five-or 6-speed bicycle, there is one gear shift lever on the right side which controls the derailleur on the rear wheel. On a 10-to 21-speed model, there are two shift levers: the one on the right controls the rear derailleur and the one on the left the front derailleur. This corresponds to the caliper brakes: the right lever operates the rear brake, the left the front.

Shift levers may be mounted on the stem, on the downtube, protruding from the ends of the handlebars, or as "thumbshifters" on the handlebars next to the handgrips on top of the bar or under the bar.

As the rear derailleur is shifted, the jockey roller guides (or derails) the chain from one sprocket to another on the rear sprocket cluster. The spring-loaded tension roller keeps the chain taut, but will "give" as the chain is shifted from one gear sprocket to another.

The front derailleur, even though it looks vastly different than the rear derailleur, serves the same function: it guides the chain from one gear sprocket to another. As the chain is moved from a large chainring to a small, the tension roller at the rear derailleur keeps the chain taut.

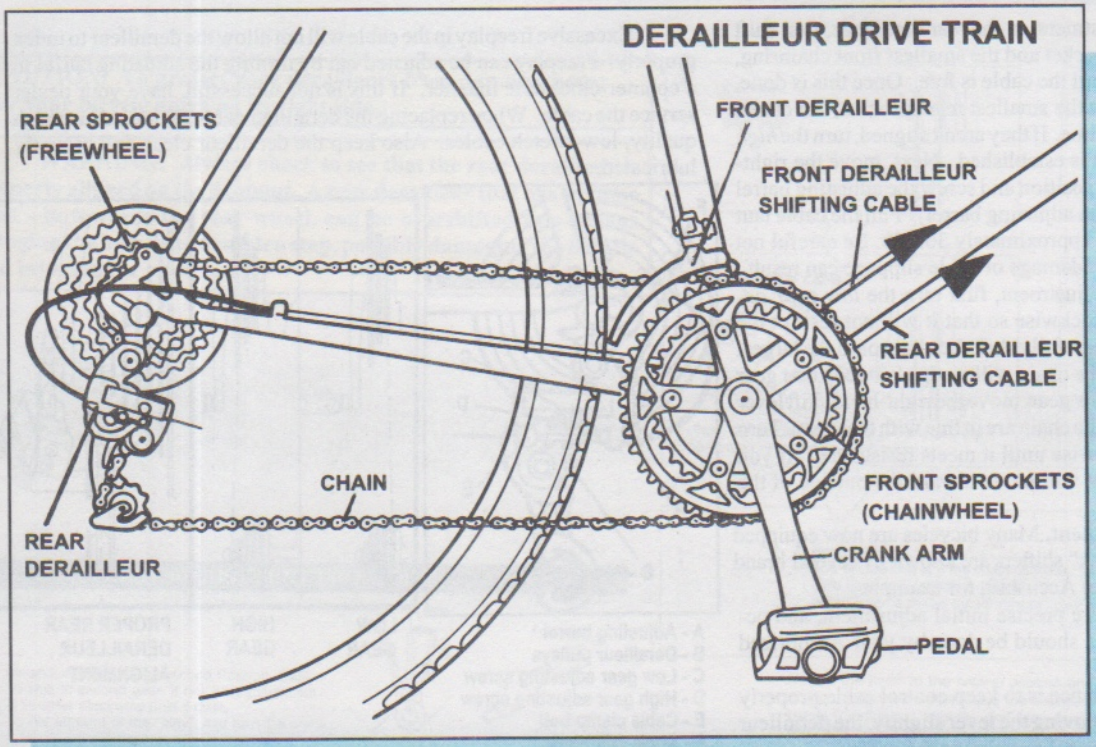
The pedals must be moving forward in order for either derailleur to work properly. Attempts to shift while not pedaling, or pedaling backward, or pedaling under load, may damage the derailleurs or may stretch the cables out of adjustment.

While the rider must be pedaling in order to shift, full or excessive pressure on the pedals may prevent the derailleurs from working properly. The wise cyclist shifts to a desired gear just before it is needed. For instance:the rider will shift into a lower gear at the foot of a hill, not part way up at the point where it is a struggle to pedal.

WARNING: On bicycles equipped with stem- or downtube-mounted shifters, shift only when there is no danger of losing control, because you'll only have one hand on the handlebar during the shift. Avoid shifting when cornering, when riding on rough or littered surfaces (such as on gravel or wet leaves), or when you may have to stop suddenly (your hand won't be on the brake lever).Keepyour eyes on the road not on your derailleurs!

If you hear a clicking or rubbing sound while riding, move either shift lever a small amount either forward or backward until the chain is quiet. These noises occur when the chain is rubbing against a derailleur, but is not yet in position to shift to the next sprocket.

If your chain shifts completely off your gear cluster, front or rear, you should adjust your derailleur. See the FRONT DERAILLEUR section on Page 26 or the REAR DERAILLEUR section on Page 24. Check and adjust your derailleurs after your first ride, as most derailleurs will need some adjustment after being used for a few times.'



Derailleur Drive Train

If shifting is sluggish or difficult, if you hear a rubbing or grinding noise, or if the chain rubs on any part of the bicycle or falls off during or after a shift, check the adjustment of the derailleurs. The rear derailleur should be checked and adjusted first because the front derailleur cannot be aligned if the rear mechanism is out of adjustment.

Rear Derailleur Adjustment

To make the high gear adjustment on the rear derailleur, first shift the chain onto the smallest rear sprocket and the smallest front chainring, then loosen the cable clamp bolt until the cable is free. Once this is done, stand behind the bicycle to see that the smallest rear sprocket, the chain, and the two derailleur pulleys are in line. If they aren't aligned, turn the *high gear adjusting screw* until this line is established. Next, move the right-hand shift lever to its most forward position and screw the adjusting barrel all the way in (not all models have an adjusting barrel). Pull the cable taut and tighten the cable clamp bolt to approximately 30in/lb. Be careful not to overtighten or undertighten - bolt damage or cable slippage can result.

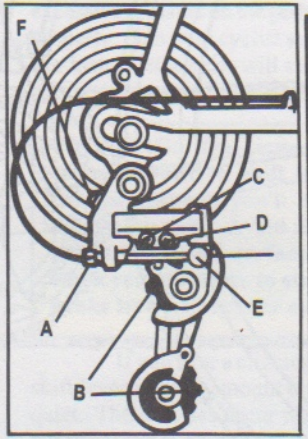
To make the low gear adjustment, first turn the *low gear adjusting screw* far enough counterclockwise so that it will not restrict the movement of the derailleur. Then carefully shift the chain onto the largest rear sprocket. Do not overshift or the chain will wedge between that gear and the wheel. Once you are in the low gear, move the right-hand shift lever until the two derailleur pulleys and the chain are in line with that gear. Turn the low gear adjusting screw clockwise until it meets resistance. (If you have turned it too far, the derailleur will move toward the outside of the bicycle.)

Indexed Derailleur Adjustment. Many bicycles are now equipped with indexed derailleurs. These "click" shifters are known by several brand names, Shimano S.I.S., and Sun Tour Accushift, for example.

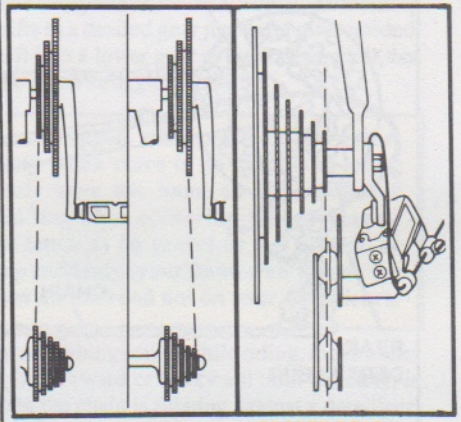
Indexed derailleurs require precise initial adjustment, and occasional readjustment. This service should be done by your Authorized Dealer.

Suggested owner maintenance is to keep control cable properly tensioned. Test this adjustment by moving the lever slightly, the derailleur should also move slightly with minimal freeplay in the cable.

Excessive freeplay in the cable will not allow the derailleur to index properly. Freeplay can be adjusted out by turning the adjusting barrel in a counter-clockwise manner. If this is not successful, have your dealer service the cable. When replacing the derailleur cable, be sure to use high quality, low-stretch cables. Also keep the derailleur clean and properly lubricated.



A - Adjusting barrel
B - Derailleur pulleys
C - Low gear adjusting screw
D - High gear adjusting screw
E - Cable clamp bolt
F - Angle adjustment'



LOW GEAR

HIGH GEAR

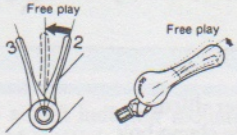
PROPER REAR DERAILLEUR ALIGNMENT

Rear Derailleur Indexed Shifting Adjustment

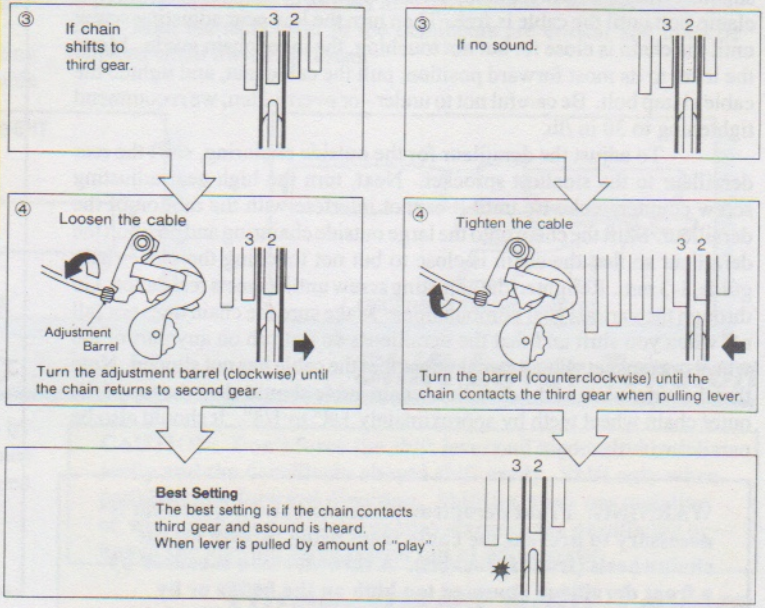
CAUTION: To protect your derailleurs from damage, never lay your bicycle down on its right side.

WARNING: Always check to see that the rear derailleur is properly aligned on the dropout. A rear derailleur that has become bent - in towards the rear wheel, can be overshifted into spokes bringing the bicycle to a sudden stop, possibly damaging the bicycle and injuring the rider.

EASY ADJUSTMENT PROCEDURE



①Set the shifting lever to the second Position. Chain should shift to second gear. If not, turn adjustment barrel counter clockwise until it does.
②Pull by the amount of the "play", and turn the crank.


③
If chain shifts to third gear.
3 2
③
If no sound.
3 2
④
Loosen the cable
3 2
Adjustment Barrel
Turn the adjustment barrel (clockwise) until the chain returns to second gear.
④
Tighten the cable
3 2
Turn the barrel (counterclockwise) until the chain contacts the third gear when pulling lever.
Best Setting
The best setting is if the chain contacts third gear and asound is heard.
When lever is pulled by amount of "play".
3 2

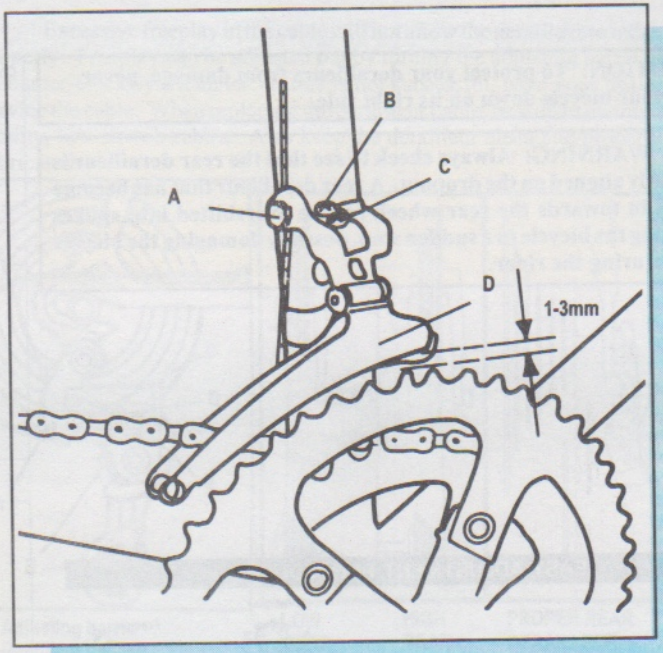
Return the lever to the original position and turn the crank. If there is contact with the third gear and the sound remains, turn the adjustment barrel (clockwise) slightly, and stop turning at the place immediately after the sound stops. (especially for the 7-speed SIS)

Front Derailleur Adjustment

To adjust your front derailleur, first shift the chain onto the smallest front chainring and the largest rear sprocket. Loosen the cable clamp bolt until the cable is free. Then turn the low gear adjusting screw until the chain is close to, but not touching, the inner chain guide. Move the lever to its most forward position, pull the cable taut, and tighten the cable clamp bolt. Be careful not to under - or overtighten; we recommend tightening to 30 in /lb.

To adjust the derailleur for the outside chainring, shift the rear derailleur to the smallest sprocket. Next, turn the high gear adjusting screw counterclockwise until it cannot interfere with the motion of the derailleur. Shift the chain onto the large outside chainring and position the derailleur so that the chain is close to but not touching the outer chain guide, 1-3 mm. Retighten the adjusting screw until it meets resistance. Go through the various gear combinations. Make sure the chain does not fall off when you shift and that the derailleurs do not rub on any part of the wheel or crankset. Finally, make sure that the cable has not slipped. Note that the outer plate of the derailleur chain guide should clear the top of the outer chain wheel teeth by approximately 1/8" to 1/4". It should also be parallel with the chain line.

WARNING: Front derailleur placement and adjustment is necessary to prevent the chain from being thrown off the chainwheels (front sprockets). A thrown chain is caused by a front derailleur mounted too high on the frame or by simply being out of adjustment and can lead to rider injury and/or bicycle damage. Have all derailleur adjustments checked by your dealers.



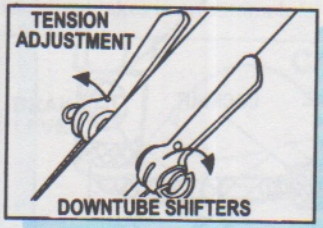
Front Derailleur

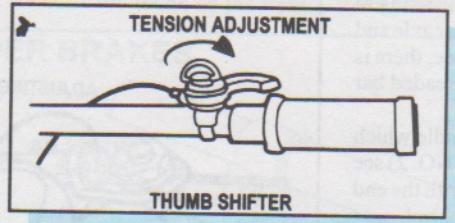
A) Cable clamp bolt
B) Low gear adjusting screw
C) High gear adjusting screw
D) Chain guide

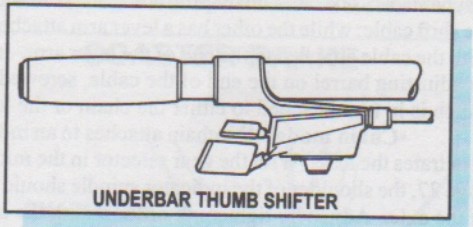
Shift Levers

There are three basic types of shift levers that serve the same purpose of changing gears. They are found in different locations depending on the style of your bicycle.

Whether your bicycle is equipped with indexed "click" shifting or standard shifting the shift lever, when pushed or pulled, causes the cable to activate the derailleurs. Shift levers should always be clamped tightly to frame or handlebars in an easy to reach position. The steel cables that travel from the shift lever to the derailleurs are critical and must be replaced when frayed or rusted.







Shift Lever Tension

If either derailleur will not stay in a particular gear or shifts by itself, simply tighten the tension screw to the point where shifting becomes difficult. If this does not correct your shifting problem see your Authorized Dealer.

CAUTION: Don't force the shift levers. They should move easily and the derailleurs should shift easily. Shift only when pedaling in a forward direction. Shifting when not pedaling or when pedaling backwards may damage the derailleurs or knock the shifting mechanisms out of adjustment.

Three-Speed Shift Levers

Three-speed bicycles will have a shift indicator mounted on the handlebars that will have marks for H-M-L (High, Middle, Low) or 1-,2-,3. To shift from one gear to another, stop pedaling. Move your shift lever to the desired gear, and then resume pedaling.

Three-Speed Hubs

There are a number of three-speed rear hubs, and specific instructions for maintenance and adjustment of the one on your bicycle is best handled by your dealer. The following is a general description and may be superseded by instructions for the specific hub with your bicycle.

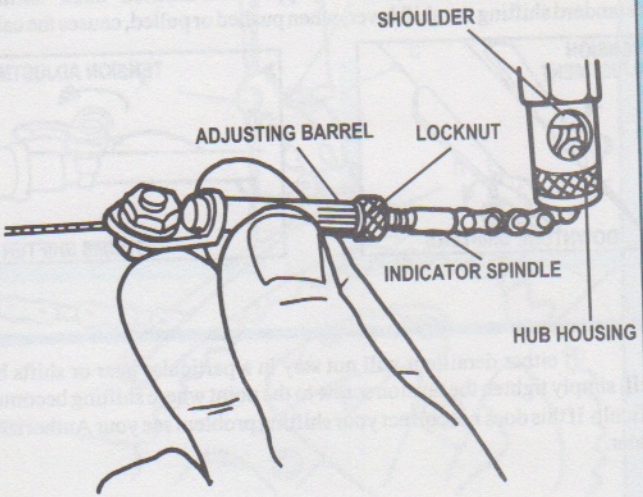
Generally speaking, there are two types of rear hub shifting mechanisms: one has a chain protruding from the axle and connecting to the shift cable; while the other has a lever arm attached to the rear axle and with the cable attached to the end of the lever arm. In either case, there is an adjusting barrel on the end of the cable, screwed onto a threaded bar which is in turn attached to either the chain or the lever.

•**Chain model**: the chain attaches to an indicator spindle which penetrates the axle. With the gear selector in the middle gear (NO. 2) see page 27, the shoulder of the indicator spindle should be even with the end of the axle. Adjust by tightening or loosening the adjusting barrel.

•**Lever model**: with the gear selector in the middle gear (NO. 2), the arrow on the lever arm should line up even with the vertical line on the housing over the end of the axle which supports the lever arm.

The hub components require special tools and training for disassembly and repair. If you cannot satisfactorily adjust the shifting, see your Authorized Dealer.

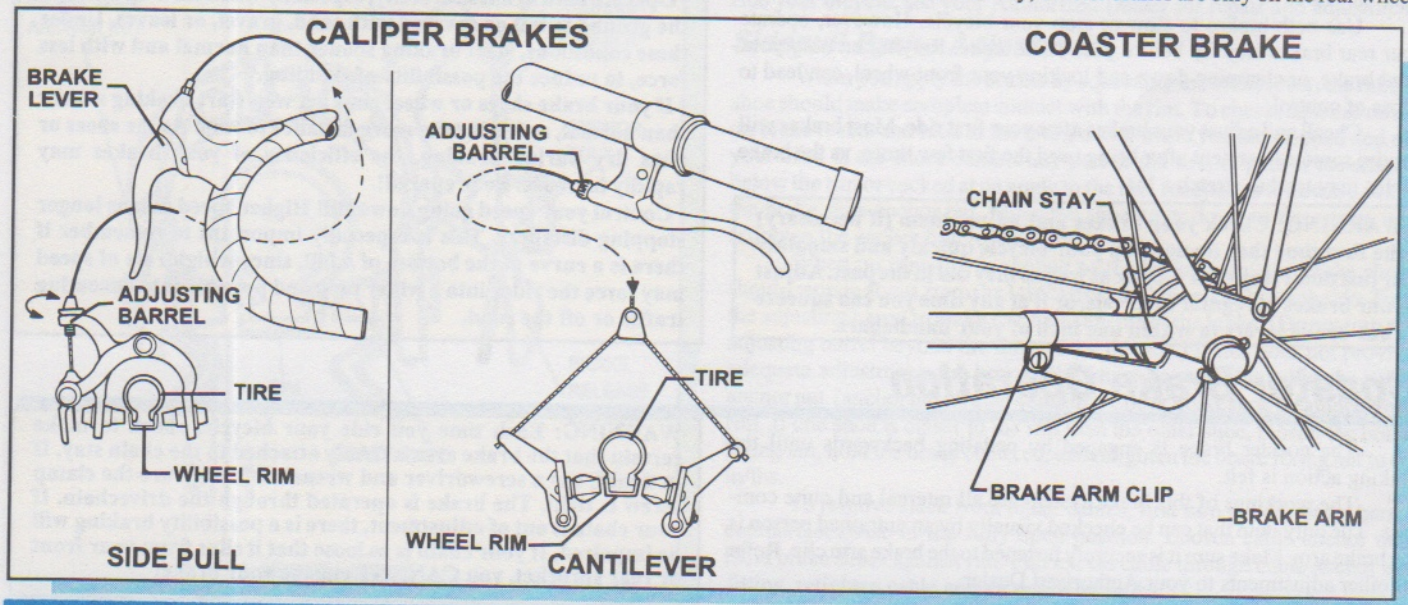
WARNING: Riding a three-speed bicycle with the rear hub improperly adjusted can cause a sudden slippage in the crank. This can lead to injury so always have your Authorized Dealer check three-speed hub adjustment.



CHAIN MODEL

VI BRAKING

There are two types of brakes commonly found on bicycles. Caliper brakes have brake shoes that can be squeezed against a wheel rim much like disc brakes in an automobile. These are normally found on the front and rear wheels. Coaster brakes are within the rear wheel hub. When applied, brake shoes are forced against the side of the rear hub, similar to drum brakes on a car. Normally, coaster brakes are only on the rear wheel.



Caliper Brake Operation

Caliper brakes are operated by brake levers mounted on the handlebars. Operate your brakes by gradually squeezing the brake levers until braking action is felt. When properly installed, brakes match derailleur operation: the left hand lever operates the front brake and the right, the rear, much as the left shift lever operates the front derailleur and the right the rear.

Use both brakes to slow or stop your bicycle. However, operate your rear brakes slightly before your front brake. Relying on only your front brake, or clamping down and locking your front wheel, can lead to a loss of control.

Check and adjust your brakes after your first ride. Most brakes will require some adjustment after being used the first few times, as the brake cables may tend to stretch a bit.

WARNING: Check your brakes and adjust them (if necessary) the first time they do not stop your bicycle quickly and smoothly or just don't stop your bicycle as well as they did in the past. Adjust your brakes at regular intervals, or if at any time you can squeeze your brake levers to within one inch of your handlebars.

WARNING:

- **Properly adjusted caliper brakes are very effective. However, if the front brake is applied too strongly, the rider may loose control and be thrown from the bicycle, especially if the rear brake is not applied first.**
- **Operate both brakes carefully, especially when turning or when the ground is wet or covered with sand, gravel, or leaves. Under these conditions, start braking sooner than normal and with less force, to reduce the possibility of skidding.**
- **If your brake shoes or wheel rims get wet, start braking sooner than normal, as it will take more distance to stop. As the shoes or rims dry during braking, the efficiency of your brakes may rapidly increase. Be prepared!**
- **Control your speed going downhill! Higher speed means longer stopping distances. This is especially important to remember if there is a curve at the bottom of a hill, since a high rate of speed may force the rider into a wider turn and possibly into oncoming traffic or off the road.**

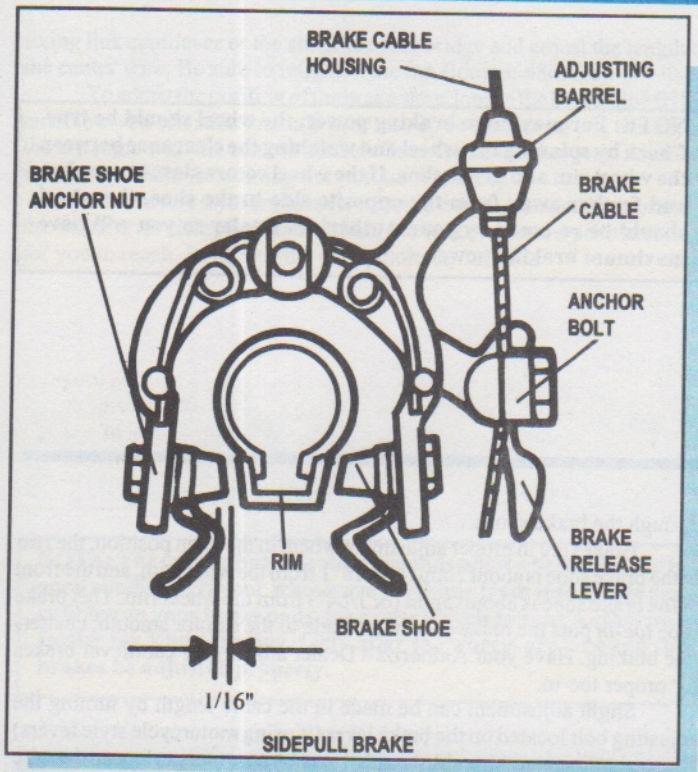
Coaster Brake Operation

The coaster brake is engaged by pedaling backwards until the braking action is felt.

The workings of this brake system are all internal and quite complex. The only item that can be checked visually by an untrained person is the brake arm. Make sure it is securely fastened to the brake arm clip. Refer all other adjustments to your Authorized Dealer.

WARNING: Each time you ride your bicycle, check to make certain that the brake arm is firmly attached to the chain stay. If in doubt, use a screwdriver and wrench to make sure the clamp screw is tight. The brake is operated through the drivechain. If your chain is out of adjustment, there is a possibility braking will be impaired. If your chain is so loose that it slips from your front or rear sprocket, you CANNOT engage your brake!

Caliper Brake Adjustments



SIDEPULL BRAKE

Considering the crucial job of the braking system on your bicycle, it is best left to your Authorized Dealer to do the adjustments.

The following information will give you a general understanding of how your brakes work and how to do some minor adjustment. If you do not feel 100% confident in your ability to stop your bicycle, don't ride your bicycle, see your Authorized Dealer for repair and adjustment.

Sidepull Brake Adjustment

When you apply the brakes by squeezing the brake lever, the rubber shoe should make complete contact with the rim. To check, squeeze down on brake levers and look at the brake shoes while you are stopped and off your bike. If the shoes contact any part of the tire, or part of the shoe is below the rim or cocked at an angle to the rim, readjust as follows: Loosen the brake shoe anchor nut. Move the shoe up or down as necessary, and retighten the anchor bolt to 48 in/lbs.

When no pressure is applied to the brake lever, the brake shoes should remain about 2mm (or 1/16") from the wheel rim on each side. Turn the adjusting barrel to make fine adjustments of the brake. (Do not turn the adjusting barrel beyond the limit of the threads.) If this does not provide adequate adjustment, the brake cable must be repositioned in the cable anchor nut (anchor nut torque: 48in/lbs). Check brake shoe clearance from rim. If one shoe is closer to the rim than the other shoe, loosen the brake fixing nut, hold the brake centered, and retighten the brake fixing nut to 60 in/lbs.

To remove slack from brake cables, first turn the adjusting barrel counterclockwise to the fully open position. Loosen cable anchor nut: Hold brake shoes against rim. Pull excess cable through cable anchor nut fitting, retighten cable anchor nut to 48 in/lbs.

Caliper Brake Adjustment

Brake release levers

The brake release lever opens the brake to allow the inflated tire to slip out from between the brake shoes during removal of the wheel. The location of the lever varies with the brand and model of the brake. Some brakes have the quick release mechanism attached to the cable anchor nut (as pictured). Others have the mechanism attached to the adjusting barrel. The brake release is in the closed position when the brake pads are brought closest to the rim by the lever.

NOTE: For maximum braking power, the wheel should be true. Check by spinning the wheel and watching the clearance between the wheel rim and brake shoe. If the wheel comes close to one shoe and farther away from the opposite side brake shoe, the wheel should be re-trued by your Authorized Dealer so you will have maximum braking power.

Cantilever Brake Adjustment

Cantilever brakes are slightly more complex than sidepull brakes, and therefore adjustments are more involved. Your Authorized Dealer should make these adjustments.

A cantilever brake has two control cables, one cable goes from the brake lever down to a small aluminum fitting called a cable carrier. It is held in the cable carrier by an anchor bolt. Another cable, called the cross cable, slides in a groove in the cable carrier. One end of the wire is held to one of the brake arms by an tab end which fits into a groove in the remaining brake arm as shown. This is the end of the center wire you pull out to spread brakes apart so that you can remove the inflated tire and wheel through the brake shoes.

Brakes are in proper adjustment when, in the open position, the rear of the brake shoe is about 2mm (or 1/16") from the wheel rim, and the front of the brake shoe is about .5mm (or 1/64") from the wheel rim. This brake shoe *toe-in* puts the brake shoe at an angle to the rim for smooth, chatter-free braking. Have your Authorized Dealer adjust your cantilever brakes for proper toe-in.

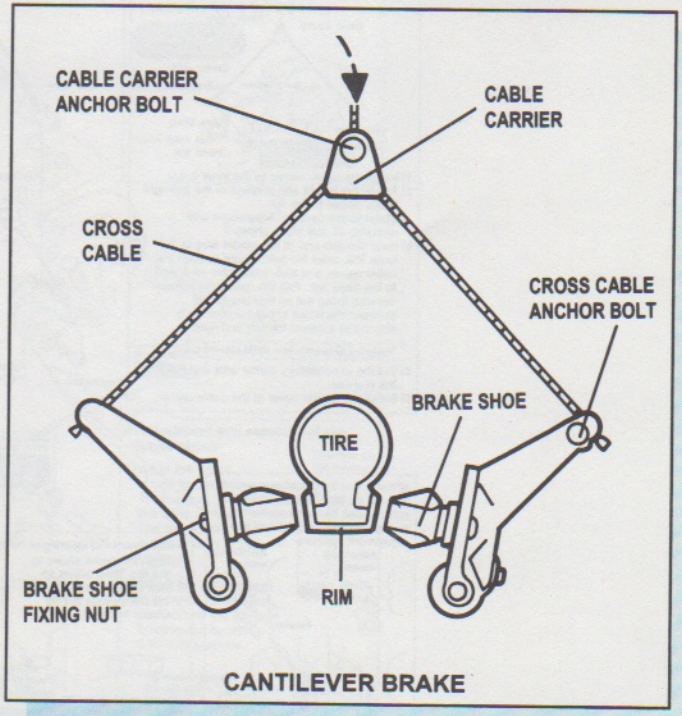
Slight adjustment can be made in the cable length by turning the adjusting bolt located on the brake lever (if using motorcycle style levers) For large adjustments in cable length it may be necessary to loosen the wire

fixing link cantilever or the straddle cable bridge and adjust the length of the center wire. Be sure to retighten the nut (torque: 48in/lbs).

To adjust the position of the brake shoe, loosen the brake shoe fixing nut. Now you can slide the shoe in or out, up or down, and you can adjust the toe angle with the control washer. Once the shoe is properly adjusted, tighten the brake shoe fixing nut (torque: 72in/lbs).

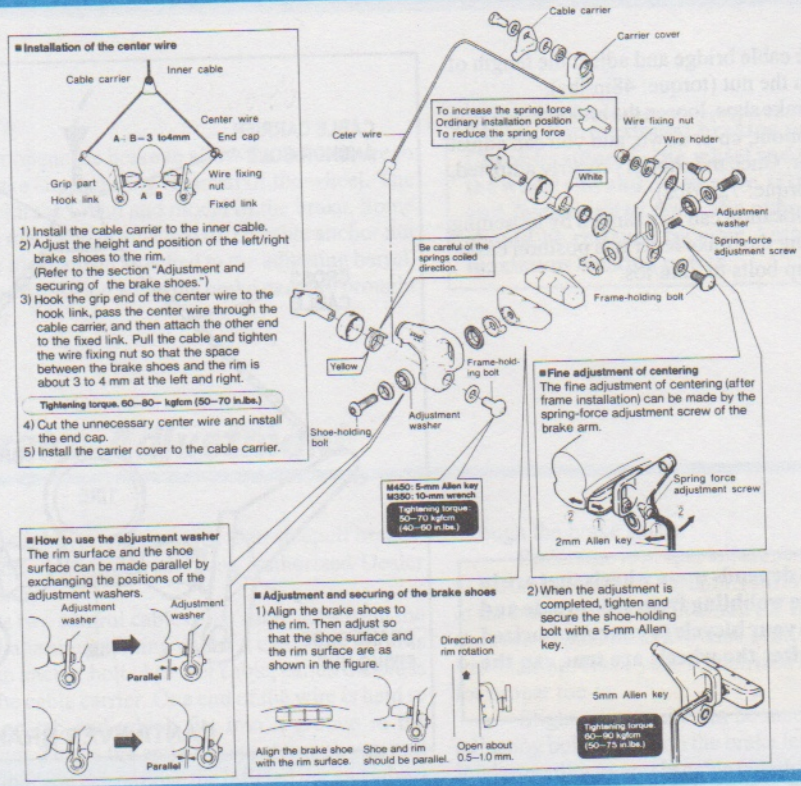
Motorcycle style brake lever location can be changed by loosening the brake lever clamp bolt and shifting the brake lever to a position easier for you to reach. Retighten the clamp bolts to 72in/lbs.

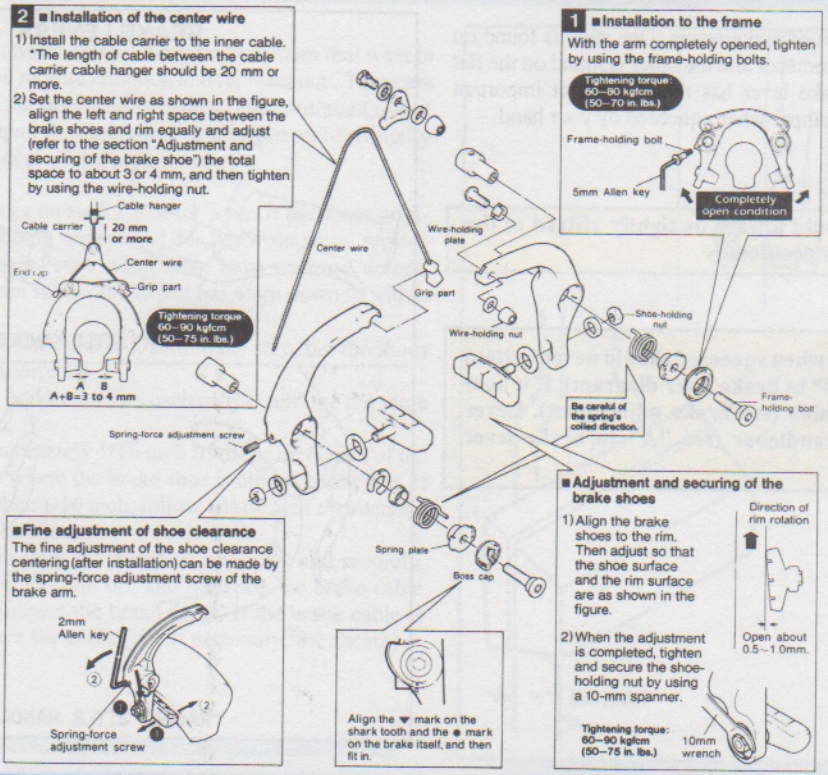
NOTE: The caliper brake system depends upon wheels that are in good condition. If your wheels are wobbling from side to side and rubbing on your brake pads, take your bicycle to your Authorized Dealer for wheel trueing. Only after the wheels are true can the brakes be adjusted properly.



CANTILEVER BRAKE

Cantilever Brake Set Up/Adjustment


■ Installation of the center wire
Cable carrier
Inner cable
Center wire
End cap
A : B = 3 to4mm
Wire fixing nut
Fixed link
Grip part
Hook link
A B
1) Install the cable carrier to the inner cable.
2) Adjust the height and position of the left/right brake shoes to the rim. (Refer to the section "Adjustment and securing of the brake shoes.")
3) Hook the grip end of the center wire to the hook link, pass the center wire through the cable carrier, and then attach the other end to the fixed link. Pull the cable and tighten the wire fixing nut so that the space between the brake shoes and the rim is about 3 to 4 mm at the left and right.
Tightening torque: 60–80 kgfcm (50–70 in.lbs.)
4) Cut the unnecessary center wire and install the end cap.
5) Install the carrier cover to the cable carrier.
Cable carrier
Carrier cover
Ceter wire
To increase the spring force
Ordinary installation position
To reduce the spring force
Wire fixing nut
Wire holder
White
Adjustment washer
Spring-force adjustment screw
Be careful of the springs coiled direction.
Frame-holding bolt
Yellow
Frame-holding bolt
Adjustment washer
Shoe-holding bolt
M450: 5-mm Allen key
M350: 10-mm wrench
Tightening torque: 50–70 kgfcm (40–60 in.lbs.)
■ Fine adjustment of centering
The fine adjustment of centering (after frame installation) can be made by the spring-force adjustment screw of the brake arm.
Spring force adjustment screw
2mm Allen key
■ How to use the abjustment washer
The rim surface and the shoe surface can be made parallel by exchanging the positions of the adjustment washers.
Adjustment washer
Adjustment washer
Parallel
Parallel
■ Adjustment and securing of the brake shoes
1) Align the brake shoes to the rim. Then adjust so that the shoe surface and the rim surface are as shown in the figure.
Direction of rim rotation
Align the brake shoe with the rim surface.
Shoe and rim should be parallel.
Open about 0.5–1.0 mm.
2) When the adjustment is completed, tighten and secure the shoe-holding bolt with a 5-mm Allen key.
5mm Allen key
Tightening torque: 60–90 kgfcm (50–75 in.lbs.)

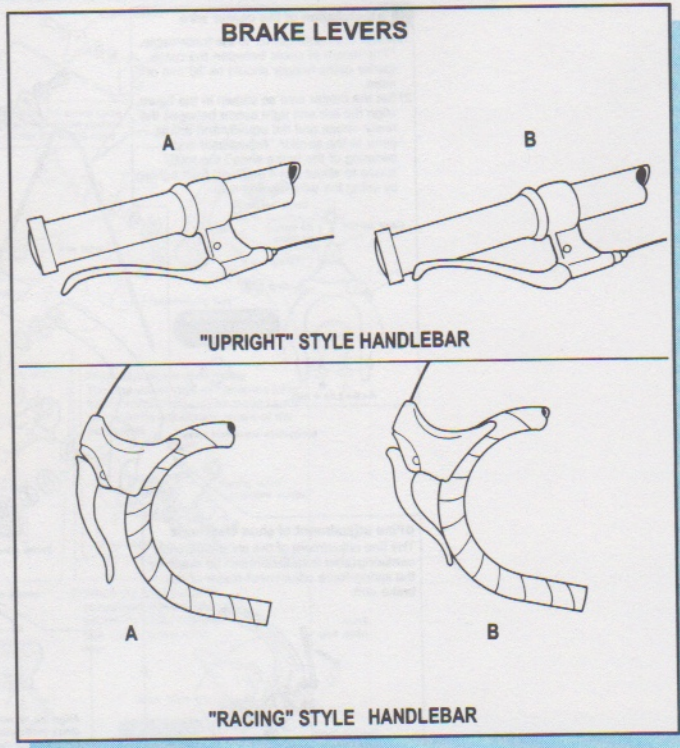

2 ■ Installation of the center wire
1) Install the cable carrier to the inner cable. *The length of cable between the cable carrier cable hanger should be 20 mm or more.
2) Set the center wire as shown in the figure, align the left and right space between the brake shoes and rim equally and adjust (refer to the section "Adjustment and securing of the brake shoe") the total space to about 3 or 4 mm, and then tighten by using the wire-holding nut.
Cable hanger
Cable carrier
20 mm or more
Center wire
End cap
Grip part
Tightening torque: 60–90 kgfcm (50–75 in. lbs.)
A
B
A+B=3 to 4 mm
1 ■ Installation to the frame
With the arm completely opened, tighten by using the frame-holding bolts.
Tightening torque: 60–80 kgfcm (50–70 in. lbs.)
Frame-holding bolt
5mm Allen key
Completely open condition
Center wire
Wire-holding plate
Grip part
Wire-holding nut
Shoe-holding nut
Frame-holding bolt
Be careful of the spring's coiled direction.
Spring-force adjustment screw
■ Fine adjustment of shoe clearance
The fine adjustment of the shoe clearance centering (after installation) can be made by the spring-force adjustment screw of the brake arm.
2mm Allen key
Spring-force adjustment screw
Spring plate
Boss cap
Align the ▼ mark on the shark tooth and the ● mark on the brake itself, and then fit in.
■ Adjustment and securing of the brake shoes
1) Align the brake shoes to the rim. Then adjust so that the shoe surface and the rim surface are as shown in the figure.
2) When the adjustment is completed, tighten and secure the shoe-holding nut by using a 10-mm spanner.
Direction of rim rotation
Open about 0.5–1.0mm.
Tightening torque: 60–90 kgfcm (50–75 in. lbs.)
10mm wrench

Brake Levers

There are two basic styles of brake levers. One style is found on the downturned "racing" style handlebar and the other is found on the flat or "upright" handlebar. The brake lever has the simple but important function of activating the brake caliper when squeezed by your hand.

NOTE: The brake lever should always be tightly affixed to the handle bar in a easy to reach position.

CAUTION: The brake lever when squeezed should never bottom out on the handlebar (see "B" in brake lever diagram). If it does you need to tighten your cable (see brake adjustment). Lever should stop 1" from the handlebar (see "A" in brake lever diagram).



These are two components of the caliper brake system that wear in the normal course of use and require attention and replacement. These are the rubber brake shoes and the steel control cables. The continued use of worn shoes or cables will impair the function of your brakes and eventually lead to a dangerously low level of stopping power.

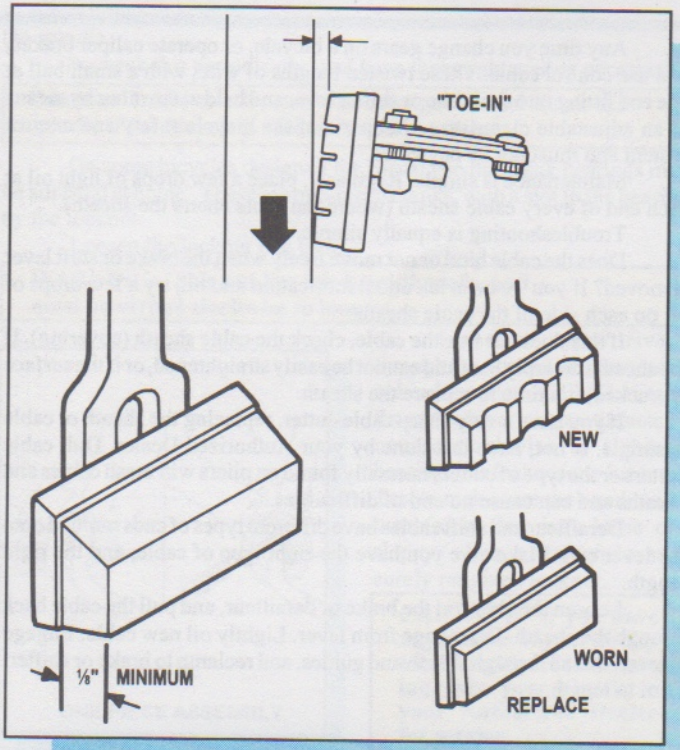
Check both brake shoes on each brake for wear. If the shoes originally had a tread on their rubbing surface and this has worn away, replace both shoes. If the brake shoes, even when new, have no tread design, replace both brake shoes when rubber brake pad has worn down to within ⅛ inch of the metal backing.

If the brake shoes are not worn out, then make sure that the shoes are adjusted and positioned correctly.

Check to see that the brake shoes on each caliper arm are the same distance from the wheel rim.

They should be approximately 1/16 inch from the metal rim of the wheel. Measure at the point where the brake shoe is closest to the rim. If the distance is more or less than 1/16 inch, follow adjustment instructions to properly position the brake shoes.

If either caliper brake does not function smoothly and securely, lubricate the pivot points with a light oil, and lubricate the brake cable where it enters the sheath. Inspect the brake cable. If the brake cable is rusty, frayed, or worn, replace the cable (and if necessary, the sheath).



Control Cables

Any time you change gears on a bicycle, or operate caliper brakes, you use control cable. These twisted lengths of wire, with a small ball at one end fitting into the brake or shifter lever and held at the other by means of an adjustable clamp, are vital parts of the bicycle safety and control system and must not be neglected.

Maintenance is simple. Regularly, place a few drops of light oil at each end of every cable sheath (where the cable enters the sheath).

Troubleshooting is equally simple.

Does the cable bind or not move freely when the brake or shift lever is moved? If you've been lax about lubrication and oil, try a few drops of oil on each side of the cable sheath.

If this does not free the cable, check the cable sheath (covering). If the sheath is sharply bent and cannot be easily straightened, or if the surface is cracked, it's time to replace the sheath.

If you have a very sharp cable cutter, replacing the sheath or cable is simple. If not, have this done by your Authorized Dealer. Dull cable cutters or the type of cutters normally found on pliers will mash cables and sheaths and can cause no end of difficulties.

Derailleur and shift cables have different types of ends molded onto the lever end. Make sure you have the right type of cable, and the right length.

Loosen the clamp at the brake or derailleur, and pull the cable back through the sheath. Disengage from lever. Lightly oil new cable. Engage in lever, thread through sheath and guides, and reclamp to brake or shifter. Trim to length.

A dull cutter will fray out the cable wires and make it very difficult to install through the small holes in the sheath, guides and the end mechanism!

Many cyclists make it a practice to replace a cable sheath whenever a cable is replaced, figuring both will be worn. Simply cut the new sheath to the same length as the old, move the sheath end protectors (if your bicycle has them) from the old to the new sheath, and reinstall.

Always replace your control cable if it is rusted.

Always replace your cable if it has any broken strands.

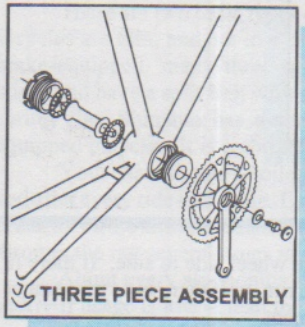
WARNING: Your bicycle is not safe to ride if it has damaged brake cables. IMMEDIATELY replace them or bring your bicycle to your Authorized Dealer for service.'

VII BEARINGS

Crank Bearings

There are two types of crank arm systems found on most bicycles:

A one piece unit in which the crank arms and their axle are forged from the same piece of metal; and a three piece system, with separate axle and crank arms.



THREE PIECE ASSEMBLY

Generally speaking, adjustments to the crank bearings are best left to the trained technicians and special tools of your Authorized Dealer.

If the crank assembly feels loose in the bicycle, or does not turn freely, take your bicycle in for service at your Authorized Dealer.

In three-piece crank arm assemblies, the crank arms were securely tightened to the spindle by your Authorized Dealer. After riding your bicycle a few times, check to make sure the crank arms have not loosened. Check this by lightly holding one crank arm at the pedal and wiggle it in and out. If there is any movement, does the other crank arm move? If the crank arms move together, you may need your crank bearings readjusted. If only one crank arm moves, the crank arm may be loose on the spindle.

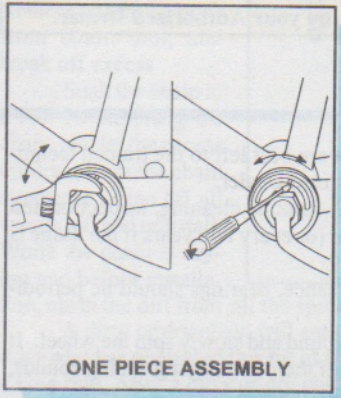
Recheck this periodically (and have them tightened as necessary).

Caution: Loose crank arms will damage themselves on the spindle if the bicycle is ridden in this condition.

On some bicycles designed for casual use the crank bearings may be adjusted at home. These are one-piece cranks, with a slot in the bearing by the locknut.

Loosen the locknut one turn.

WARNING: This nut has left-hand threads, and must be turned clockwise to loosen.



ONE PIECE ASSEMBLY

Insert a screwdriver through the slot and into the notch behind the slot. GENTLY tap the screwdriver to move the notch counterclockwise to tighten bearing, or clockwise to loosen. Test to make sure the crank will turn freely, but isn't loose or sloppy. Use a wrench to securely retighten locknut.

CAUTION: If you have any doubts of your ability to adjust this critical bearing, take your bicycle to your Authorized Dealer for service.

Head Tube Bearings

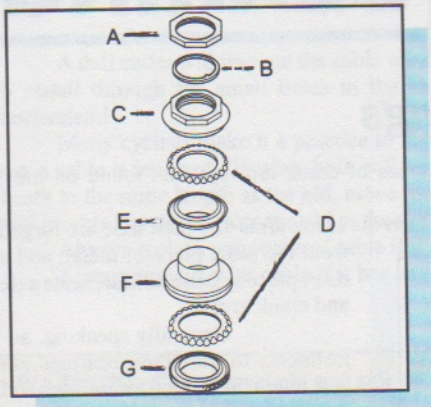
The head tube bearings, or head set, is the group of bearings that allows the handlebars, stem and fork to turn within the frame. They make up a major part of the bicycle's steering system.

It's simple to test for proper adjustment.

Grasping the frame, lift the front wheel up from the ground. Turn the fork back and forth using the handlebars. If the fork does not turn freely, or turns roughly and jerkily, it's too tight. If the fork moves up and down or sideways within the head tube, it's too loose.

Any tightness or looseness will negatively affect the handling of your bicycle. As with any bearing, improper adjustment will lead to premature wear - see your Authorized Dealer.

WARNING: The process of disassembly, cleaning, greasing, and reassembly is complicated and requires a full assortment of tools. It is recommended that this be done by your Authorized Dealer.



Headset
A) Lock nut
B) Lock washer
C) Adjusting cup/cone
D) Bearings
E) Top head race
F) Bottom head race
G) Crown race

Wheel Bearings

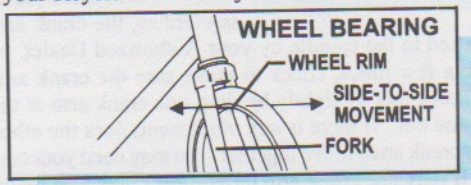
Wheel bearing adjustments are best left to the trained technicians and special tools at your Authorized Dealer.

When should this be done? Routine cleaning, inspection and regreasing should be done once a year (or every two years if the usage is very low).

In between regular maintenance, bearings should be periodically checked.

Lift your bicycle from the ground and slowly spin the wheel. If the wheel does not spin smoothly, or if there are slight grinding sounds, take your bicycle in for an adjustment.

Attempt to move the rim of the wheel side to side. If there is more than just a trace of movement at the rim, or if there is no movement at all, take your bicycle in for an adjustment.



VIII THE CHAIN

The Chain – Heart of the Power Drive

The chain transmits the power of your pedaling to the rear wheel, on a derailleur-equipped bicycle hops from sprocket to sprocket as you change gears, and in a coaster brake-equipped bicycle controls your braking. It may look like a simple piece of equipment, but don't neglect it.

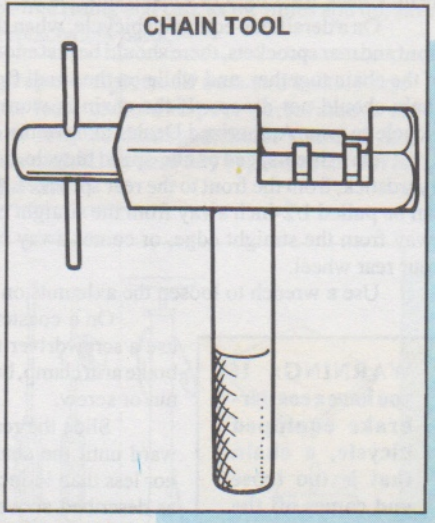
There are two basic types of chains: chains for derailleur-equipped bicycles are thin, and are in a continuous loop; while chains for coaster brake-equipped, many three-speed, and many all-terrain bicycles are wider and have a split link with a removable side plate held in place by a spring clip. Shimano has a special Narrow-type chain for derailleur-equipped bicycles. It is embossed with the word "Narrow."

Your chain should be oiled (with a No. 10 oil) at least every 30 days, and after every ride in the rain. Either place a drop on every roller or lightly brush oil on the entire chain. Hold a rag around the chain and pull the chain through the rag several times to wipe away excess oil.

About every six months – more if you are riding a lot and at least yearly if usage is low –clean the chain thoroughly.

Either use a chain break tool (if you have a Narrow chain, DO NOT use a plier- or punch-type chain tool, you must use a Shimano UG chain tool) or open the split link, depending on your model, and remove the chain from your bicycle. Soak the chain in a solvent (kerosene or a parts cleaning solvent, then scrub the chain using the solvent. Blot off the solvent with a rag and hang the chain to let it air-dry.

If using a Shimano Hyperglide, do not cut at one of the specially-shaped connecting pins. These pins have a flat head and a black color. If it is necessary to adjust the length of the chain due to a change in the number of sprocket teeth, use a reinforced special pin. With a Shimano UG chain tool, fully insert the special connecting pin. Remove from chain tool, and break off excess



Soak the chain in a No. 10 oil. Hang the chain, and let the excess oil drain from the chain overnight. Wipe off all excess oil, and reinstall. While the chain is drying and before installation, clean the dirt from all the sprockets.

A dirty or dry chain will eat up a great amount of energy, and the rider who has neglected this bit of maintenance will pay heavily for it on a long ride. Also, a dirty or dry chain may cause excessive wear both to itself and to the front and rear sprockets.

The Chain— Heart of the Power Drive

Most Common Problems

Chain comes off the sprockets. Check your derailleurs for adjustment. Check for a tight or kinked link. Is the chain too loose?

On a derailleur-equipped bicycle, when the chain is over the largest front and rear sprockets, there should be just enough slack to push two links of the chain together, and while on the small front and rear sprockets, the chain should not droop. If the chain is worn and stretched, take your bicycle to your Authorized Dealer to have the chain replaced.

On a three-speed or one-speed bicycle, hold a straight edge, such as a yardstick, from the front to the rear sprocket. A properly tensioned chain can be pulled 1/2-inch away from the straight edge. If it cannot be pulled away from the straight edge, or comes away more than 1-inch, readjust your rear wheel.

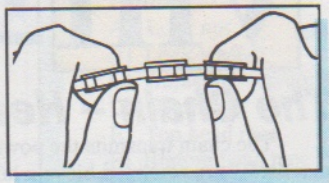
Use a wrench to loosen the axle nuts on your rear axle.

WARNING: If you have a coaster-brake equipped bicycle, a chain that is too loose and comes off the sprocket means that you have no control over your brakes!

On a coaster brake-equipped bicycle, use a screwdriver to loosen the screw in the brake arm clamp, but do not remove the clamp nut or screw.

Slide the rear wheel backward or forward until the chain can be pulled no more nor less than ½-inch from your straight edge, as described above. The rear wheel must be centered between both sides of the frame when checking the ½-inch distance.

With your wrench, securely tighten both axle nuts. For the mechanically minded, the recommended torque is 14 foot-pounds.



Hold the nut on the brake arm clamp with your wrench, and with your screwdriver firmly tighten the screw in the clamp.

The chain makes a regular clicking or thumping sound. The most common cause is a tight or kinked link. Rotate your pedals, and you'll most likely see the offender. A drop of oil may free up the stuck link. If oiling doesn't free the link, use both hands to flex the chain sideways with some force at the binding point to loosen any links that don't pivot easily with their partners.

For a severely stuck link, very carefully use a chain break tool to loosen up the crimped side plates and rollers, first slightly pushing the sticky rivet out of the roller and then carefully re-inserting it.

WARNING: Caliper-type brake failure may be caused by an excessively oily chain that throws oil onto the wheel rim. If oil does get on the rim or on the brake shoes, wash the oil off these parts with hot, soapy water and rinse off all soap with clean water. Wipe all water off rims before riding.

WARNING: Read and carefully follow all instructions included with solvents. Keep solvents away from sparks or open flame, as many are flammable. NEVER USE GASOLINE AS A SOLVENT. Never blow solvent off the chain where the solvent mist formed can be ignited by a flame or spark. Don't breathe solvent vapors – work outside, with plenty of ventilation. Properly dispose of solvent or oil-soaked rags.

IX MAINTENANCE

Maintenance and Tools

A bicycle, for the miles covered, requires more maintenance than an automobile: it is relatively fragile and its moving parts are more exposed to the elements. On the other hand, maintenance costs are minimal, the tasks are easy and take only a very little time, and can be a lot of fun.

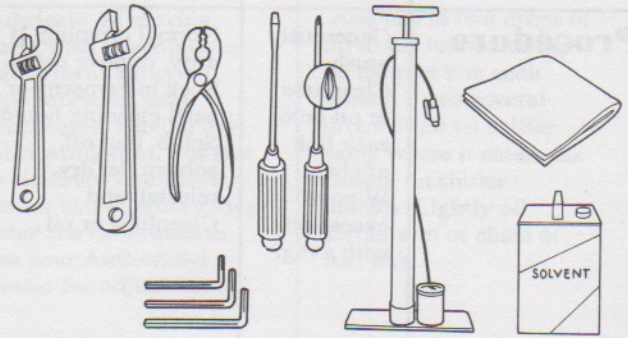
A regular schedule of preventative maintenance will add immeasurable hours of trouble-free riding and can, as the miles add up, save you money in repairs and replacement parts.

WARNING: Have your Authorized Dealer make any adjustment that is not covered sufficiently for you in the Maintenance Section, or for which you do not have the proper tools.

WARNING: Be sure to properly tighten all nuts and bolts. Parts undertightened may come loose or lead to poor performance of parts. Parts overtightened may be damaged. Since some of the bicycle's nuts and bolts are metric, be sure any replacement parts are of the proper type and size.

All maintenance procedures described in this section not requiring the services of your Authorized Dealer may be accomplished using the following tools:

Small adjustable wrench (jaws must open to at least 9/16-inch
Large adjustable wrench (jaws must open to at least 1 3/8 inch)
Slip-joint pliers
Flat-bladed screwdriver
Phillips Head screwdriver
Allen wrenches (4-, 5-, and 6mm)
** see drawings of tools**



Part	Chain	Chain	Wheels (rims)	Pedals (with removable end	Crank, Head Tube, and Wheel Hub Bearings
Interval	Every three months.	Every six months.	Every month (high usage).	Every year. (Every two to three years if usage is low.)	Every year. (Every two to three years if usage is low.)
Procedure	Generously brush Cleanlube or oil onto each link of chain. Wipe off excess oil with a rag.	Normal cleaning. If dirty, remove chain. Soak in kerosene or parts cleaning liquid. Scrub, blot off solvent, let dry, reinstall and Cleanlube or oil.	Spoke tensioning and trueing. See your Authorized Dealer.	Disassembly, cleaning, inspection and greasing is complicated and requires specials tools. See your Authorized Dealer.	Disassembly, cleaning, inspection and greasing is complicated and requires specials tools. See your Authorized Dealer.

Brakes (Caliper, Cantilever)	**Rear Sprocket Cluster**	**Derailleurs (front and rear)**	Three speed and one-speed rear hubs
Every six months.	Every three months.	Periodically (after long rides, after wet rides), at least every three months.	Monthly.
Oil all pivoting points on each brake lever and caliper arm, add five or six drops of Cleanlube or oil into each end of each brake cable where the brake wire enters sheath. If cables are still sticky after oiling, see your Authorized Dealer.	The ratchets inside the rear sprocket cluster should be Cleanlubed or oiled at the gap inside the smallest sprocket. Lay the bicycle on its left side and slowly spin the wheel while applying oil.	Lubricate all moving parts with Cleanlube or lightweight spray-on type lubricant that evaporates, leaving dry lubricating film. Put five or six drops of oil on the shifter cables where they enter the cable sheath. See your Authorized Dealer for adjustment.	Add one to two drops of oil to the lubricator cap on the rear hub each month. Place several drops of oil on shifter cable where it enters the sheath, on shifter models. Lightly oil shifter arm or chain at rear hub.

X RESOURCES

This owner's manual has been designed as a general guide to basic bicycle set-up, adjustment, maintenance and care. If you desire more technical and detailed information regarding bicycles, you may refer to the following list of resources:

Organizations

American Youth Hostels, 13321 I St. NW, Washington, DC 20005•(202) 783-6161

Bicycle Federation, 1818 R. St. NW, Washington DC 20009 • (202) 332-6986

Bicycle Institute of America, 1818 R. St. NW, Washington, DC 20009 • (202)332-6986

Bikecentennial, Inc., The Bicycle Travel Association, P.O. Box 8308, Missoula, MT 59807 • (406)721-1776

IMBA, International Mountain Bike Association, Rt. 3, Box 303, Bishop, CA 93514 • (619) 387-2757

League of American Wheelmen, 6707 Whitestone Road, No. 209, Baltimore, MD 21207 • (301) 944-3399

NORBA USA National Off-Road Bicycle Association, 1750 E. Boulder, St. Colorado Springs, CO 80909 • (719) 578-4717

United States Cycling Federation, U.S. Olympic Training Center, 1750 E. Boulder St., Colorado Springs, CO 80909 • (719)578-4581

Books

Anybody's Bike Book. Tom Cuthbertson, Ten Speed Press: Berkeley, CA. 1979. 200p.

Bicycle Road Racing. Complete Program For Training and Competition. Edward Borysewicz. Velo-News: Brattleboro, VT. 1985. 276 p.

The Cyclist's Companion. John Howard. The Stephan Greene Press: Brattleboro, VT. 1984. 286 p.

Delong's Guide to Bicycles and Bicycling. Fred Delong. Chilton Press: Radnor, PA. 1978. 278 p.

Effective Cycling. John Forester. The M.I.T. Press: Cambridge, MA. 1984. 334 p.

Freewheeling. Bicycling The Open Road. Gary Ferguson. The Mountaineers: Seattle, WA.1984. 194 p.

Glenn's Complete Bicycle Manual. Clarence Coles and Harold Glenn. Crown Publishers: New York. 1973. 339 p.

How To Avoid Bicycle Theft. Complete Handbook for Parents and Owners. Herbert J. Andrews. Hands Off Press: Tacoma, WA. 1984. 64 p.

Sutherland's Handbook For Bicycle Mechanics, 4th Edition. Howard Sutherland. Sutherland Bicycle Shop Ads: Berkeley, CA. 1985. 262 p.

The Bicycling Book. John Krausz and Vera Vander Reis Krausz, eds. The Dial Press: New York. 1982. 280 p.

The Complete Book of Bicycle Commuting. John Allen.

Rodale Press: Emmaus, PA. 1981. 305 p.

Understanding, Maintaining, and Riding the Ten Speed Bicycle. Michael Kolin and Denise de la Rosa. Rodale Press: Emmaus, PA. 1979. 276 p.

Safety Education

Outdoor Empire Publishing, 511 Eastlake Ave. East., Seattle, Washington 98109. Books, brochures and videos on bicycle safety education. Special customized materials available. (206) 624-3845

Magazines and Papers

Bicycle Guide, Raben Press, 711 Boylston St., Boston, MA 02116.

Bicycle USA (League of American Wheelmen), Suite 209, 6707 Whitestone Rd., Baltimore, MD, 21207.

Bicycling, Rodale Press, 33 E. Minor, Emmaus, PA 18098.

Cycling USA, United States Cycling Federation, 1750 E. Boulder St., Colorado Springs, CO 80909.

Fitness Cycling, 7950 Deering Ave, Canoga Park, CA 92304

Mountain Bike Action, Hi-Torque Publications, 10600 Sepulveda Blvd., Mission Hills, CA 91345.

Mountain & City Biking, Challenge Publications, 7950 Deering Ave., Canoga Park, CA 91304.

Triathlete, Triathlete Magazine, 1127 Hamilton St., Allentown, PA 18101-9959.

Velo News, 5595 Arapahoe Ave., Suite G. Boulder, CO 80303.

Winning: Bicycle Racing Illustrated, 1127 Hamilton St., Allentown, PA, 18101-9959

Safe Bicycling Laws

√Buy and wear a *properly fitted, properly adjusted* helmet every time you ride your bicycle.

√Obey all traffic laws.

√Keep right, ride with traffic and not against it. Ride single file where required.

√Watch out for drain grates, soft soulders and other road surface hazards.

√Watch out for car doors opening, or cars pulling into traffic.

√Never hitch a ride on a truck or other vehicle.

√Be extremely careful at intersections and making left turns.

√Use hand signals to indicate turning or stopping.

√Protect yourself at night with reflectors and lights.

√Keep your bike safe and mechanically sound.

√Stay alert and watch out for others.

A quarter saves the day

There are many tools available for your bicycle: one of the most useful is a quarter. Tape one inside your tool bag, patch kit, or handlebar bag, and save it for the time you absolutely have to make a telephone call!

Off-Road Etiquette and Safety Tips

We support the National Off-Road Bicycle Association, and encourage all-terrain riders to ride responsibly by following the NORBA Code:

National Off-Road Bicycling Association (NORBA) Off-Road Cyclist Code

Off-pavement bicycling can open new horizons for you. In order to maximize the benefit of your adventure and maintain the quality of the experience for those who will follow you, we urge you to adopt this code as your own.

1. I will yield the right-of-way to other non-motorized recreationalists. I realize that people judge all cyclists by my actions.
2. I will slow down and use caution when approaching or overtaking another, and will make my presence known well in advance.
3. I will maintain control of my speed at all times, and will approach turns in anticipation of someone around the bend.
4. I will stay on designated trails to avoid trampling native vegetation and minimize potential erosion to trails by not using muddy trails or short-cutting switchbacks.
5. I will not disturb wildlife or livestock.
6. I will not litter. I will pack out what I pack in, and pack out more than my share whenever possible.
7. I will respect public and private property, including trail-use signs, no-trespassing signs and will leave gates as I have found them.
8. I will always be self-sufficient and my destination objective and travel speed will be determined by my ability, my equipment, the terrain, and the present and potential weather conditions.
9. I will not travel solo when bikepacking in remote areas. I will leave word of my destination and when I plan to return.
10. I will observe the practice of minimum-impact bikepacking by taking only pictures and memories, and leaving only waffle prints.

FREE ISSUE!

Send me a free issue of *Bicycle Guide*.

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Send to: **BICYCLE GUIDE**
P.O. Box 52066
Boulder, CO 80231

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Challenge Publications, Inc.
7950 Deering Ave., Canoga Park, CA 91304

1R-2Fgh 13999

RALEIGH CYCLE COMPANY OF AMERICA
BICYCLE LIMITED WARRANTY

Raleigh warrants the replacement of any original part due to defect in material and/or workmanship of this Raleigh bicycle. This warranty shall continue in full force and effect for the duration of the original ownership following the date of purchase. Such purchase to be documented by **original sales slip or other proof of purchase** by such owner. Dealer labor charges and transportation costs are covered by Raleigh for one year on frames and 90 days on parts; after this period these costs are the responsibility of the bicycle owner.

CONDITIONS OF WARRANTY

1. Your bicycle has been designed for general transportation and recreational use. It has not been designed to withstand abuse associated with stunting and jumping. This warranty ceases when you rent, sell or give away the bicycle, install a motor or otherwise modify the bicycle, ride with more than one person, or use the bicycle for stunting or jumping.

2. This warranty does not cover ordinary wear and tear or anything you break or bend accidentally or deliberately, or due to deterioration, exposure, misuse, abuse, alteration, negligence or improper maintenance.

3. It is the responsibility of the initial consumer purchaser to assure that normal maintenance services and adjustments necessary to keep the bicycle in good operating condition and properly made. This warranty does not apply to damage due to failure to properly maintain or adjust the bicycle.

For warranty service under the Raleigh Bicycle Limited Warranty, take your bicycle along with the original sales receipt with the date of purchase, model number and serial number to your local Authorized Raleigh Dealer.

Raleigh Cycle Company of America, 22710 72nd Ave. So., Kent, Washington 98032, USA

Raleigh is a division of the Derby Cycle Corporation

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Raleigh Cycle Co.,
Division of the Derby Cycle Corp.
22710 72nd Avenue South
Kent, WA 98032

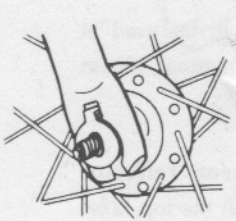
Owner's Manual Supplement

Attaching Front Wheel:

Remove axle nuts, washers and axle retention device from the ends of the axle. The axle cone bearing adjustment should permit smooth rotation of wheel. Cone locknut should be securely fastened against axle cone (A) to prevent loosening of cone. Place the front wheel between the fork blades with axle retention device on the axle (B) and the projecting prongs of the retention device securely fitting the slot in the fork. Reset locking washers and nuts on axle. Tighten axle nuts at both ends gradually and alternately in order to keep the wheel centred to a torque of 20Nm.

Caution: Front wheel must be installed with retention devices securely placed into slots of fork blades. This will ensure positive locking of front wheel to the front fork.

Caution: Make sure to have fork retainer from small-box & securely place into fork eyelet.



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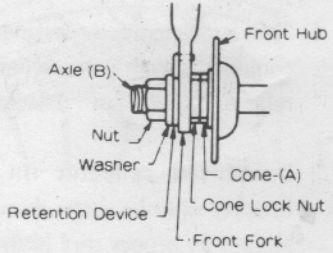

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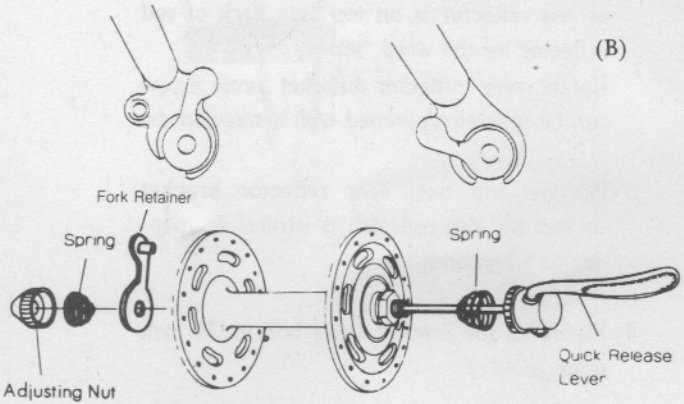


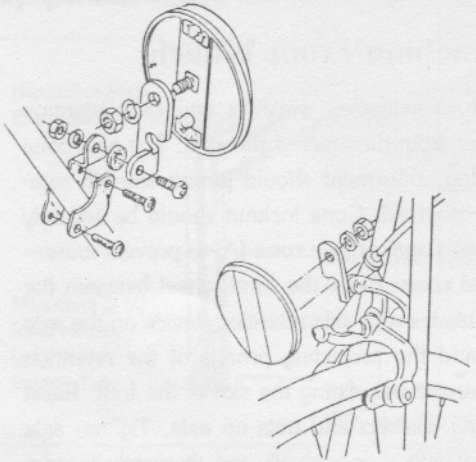
Attaching Rear Reflector:

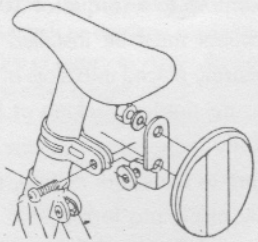
1 This supplement is designed to be used in conjunction with your owners manual, please refer to the section, "reflectors".

2 Install **red reflector** on **rear reflector bracket** with the screw through the top hole. Make sure proper stud (if there are two) goes into a hole so that one of the two "top" edges of **red reflector** is on top (see back of **red reflector** for the word "top").
Rotate **rear reflector bracket** untill screw can be securely tightened with a screwdriver.

3 Position and hold **rear reflector bracket** so that the **red reflector** is vertical (perpendicular to ground).

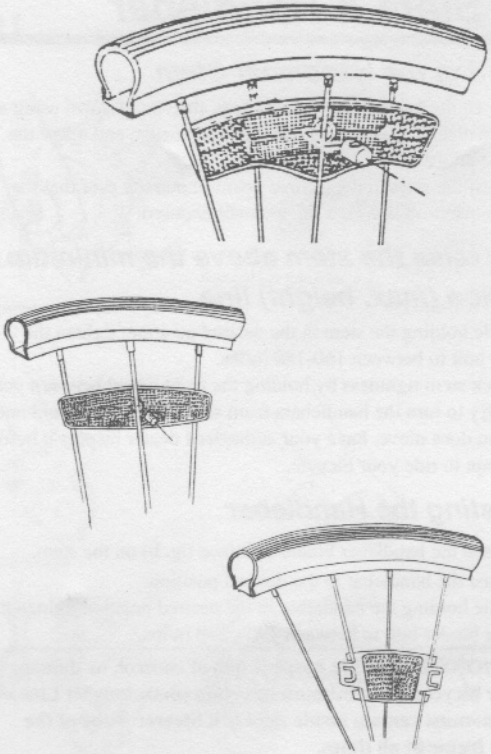
4. Please torque bracket fixing bolt to 75 inch pounds.





Attaching Spoke Reflector:

Every bicycle comes with 2 spoke reflectors. As you might guess, these mount onto the spokes (one reflector per wheel). In theory, it's best to mount them directly opposite the valve stem, weaving them between spokes, so they rest in the same plane as the rim. The idea behind mounting them here is that the wheel is heaviest at the valve (the rim is reinforced there, and the valve itself weights more than air); the added weight of wheel reflectors counterbalances the weight of the rim reinforcement and valve stem. Attach reflector between the spokes with the centre of the reflector no further than 76mm from the edge of the rim. Although plastic spoke reflectors and rotating weights and throw the wheel off-balance, they don't harm the bike's performance to any great degree, and they're the most effective of all reflectors at night. We must recommend that you keep them on!



The Stem & Handlebar

Adjusting the Handlebar Stem

1. Loosen the handlebar expander bolt, then tap it down using a wooden mallet. This will free the expander wedge and allow the stem to be adjusted.
2. Adjust the stem to the desired position making sure that the minimum insertion line (see fig. a) is not exposed.

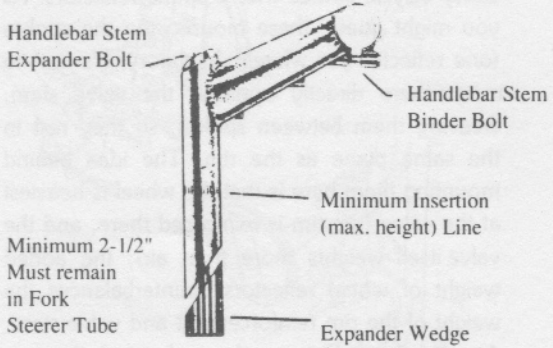
Never raise the stem above the minimum insertion (max. height) line.

3. While holding the stem in the desired position, tighten the expander bolt to between 160-180 in/lbs.
4. Check stem tightness by holding the front wheel between your legs and try to turn the handlebars from side to side. It should not turn. If the stem does move, have your authorized dealer inspect it before you attempt to ride your bicycle.

Adjusting the Handlebar

1. Loosen the handlebar binder bolt (see fig. b) on the stem.
2. Adjust the handlebar to the desired position.
3. While holding the handlebar in the desired position tighten the handlebar binder bolt to between 190 - 240 in/lbs.

CAUTION: To prevent possible loss of control, or damage to your bicycle, the minimum insertion (max. height) Line on the stem must remain inside the Fork Steerer Tube of the bicycle frame at all times.



(Fig. a) (Fig. b)

CAUTION: Do Not overtighten the handlebar stem expander bolt or the stem binder bolt. Overtightening may cause risk of injury to rider. Follow the specifically recommended torque ratings listed below:
Handleber Stem Expander Bolt: 160 - 180 in/lbs
Handlebar Stem Binder Bolt: 190 - 240 in/lbs
It is recommended that your authorized bicycle dealer check all adjustments you have made at home.